The Chemical Age

VOL LXVII 27 DECEMBER 1952 No 1746

INDEX TO ADVERTISERS IN THIS ISSUE

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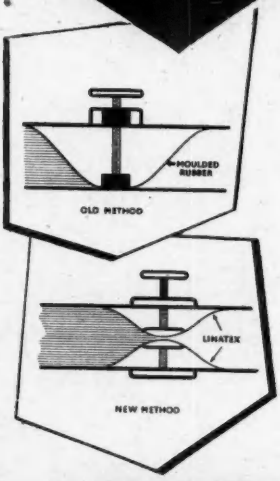

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Science and the Colombo Plan

IT is scarcely cynical to suspect that international plans are introduced with the same kind of skill that is used to give household names to proprietary soups or soaps. But the ultimate test is inescapable and it lies with details, not so much with details on paper as with those of the plan's actual working. The Colombo Plan, a bold scheme to provide South and South-East Asia with the means for fuller development, and with as much assistance from outside the area as is necessary and possible, is an excellent example.

The Colombo Plan offers help in two forms—the provision of finance for suitable development projects, and technical help. Without the latter, little benefit can come from the former. Technical skill must be brought to these areas and it must also be developed by training. The Colombo Plan's Technical Co-operation Scheme is now two years old. Its Bureau in Colombo acts as a clearing-house for receiving both requests and offers of technical assistance though, once help and need have been brought together, the actual arrangements for sending and receiving technical personnel are left to direct discussion. India's contributions to the Colombo Plan are particularly notable. She has made available to Ceylon the services of experts on caustic soda, iron, and steel manufacture. To help in training technicians she has provided scholarships in Indian educational centres for Pakistan, Ceylon, Indonesia, Nepal, and Thailand. Pakistan has made similar but smaller contributions, including sugar agronomy scholarships for Ceylon students. The total effort that Asian countries can mutually make cannot, however, be expected to be substantial yet. The lion's share of technical help must inevitably come from outside. Up to the end of August, 1952, the services of 80 technical experts had been provided through the scheme. These came from Britain (39), Australia (21), New Zealand (13), Canada (4), and India (3). They have been sent to India (15), Pakistan (36), and Ceylon (29).

Much more has been done in the direction of training Asia's own potential technicians. Facilities for training 658 people have been provided, 207 by Britain, 218 by Australia, 107 by New Zealand, 95 by Canada, 30 by India, and 1 by Pakistan. Eleven different Asian countries have filled these places. India with 261, Pakistan with 182, and Ceylon

with 148 have taken most of them. But Malaya has sent 27 trainees, Indonesia 16, and Singapore, North Borneo, Sarawak, Nepal, the Philippines and Thailand are all represented. For the future more emphasis is likely to be laid upon developing training establishments in the Colombo Plan area.

Britain's own part, as judged by figures up to the end of September, 1952, has not been niggardly. The total number of requests made to Britain for the supply of technical experts was 136. Against these 65 offers were made, 44 of these having already been taken up. It is perhaps a little surprising that 12 of the 65 offers were not taken up by the requesting Asian countries. So high a proportion might imply an inadequacy in quality or suitability that is not revealed in figures alone. Requests for 613 training places were made and the British response was to offer 416 places. These figures relate to specific requests for nominated trainees. To them there must be added 300 further places offered generally and against which nominations have yet to be made by Colombo Plan countries. In all, therefore, Britain has offered 700 training places. At a time when our own students are sent down if they fail to make satisfactorily steady progress, an offer on this scale is no stinted contribution.

In view of the difficulty of finding suitable experts for specific projects, it has been suggested by the United Kingdom Government that requests for the services of British consultant firms and technical consultants could be considered as part of the Colombo Plan, and it is reported that from the three main countries, India, Pakistan, and Ceylon a number of such requests have been received and are being negotiated. This is a development we note with particular interest for readers will perhaps recall that we have several times stressed the view that the fuller use of scientists as consultants is the most practical solution to the scientist scarcity problem. The British supply of equipment has so far been limited, and on the whole equipment supply seems still in the request-being-considered stage, and equipment up to the value of £1,000,000 is said to be involved.

The original scheme of May, 1950, visualised a total supply of technical help to the value of £8,000,000 from all the Commonwealth Governments, this figure to be reached by June, 1953. Early and interim data suggest that the Colombo Plan is being actively implemented on the scale laid down. The more fully developed Commonwealth countries will not find that they have invested unwisely in Asia's future. Their only regret may be that efforts of this nature were not made 20 years ago.

On Other Pages

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Notes & Comments

The Axe

ON a number of occasions this year, particularly when commenting upon reports from the DSIR, we have deplored any possibilities of reduction in the funds of state science. Our fears and our warning have now been shared by *The Observer* (14 December, 1952). This exceptionally well-informed newspaper states it as a fact rather than possibility that the DSIR is suffering from economy cuts. A few days before we had noted a news report that an appeal was being made against a policy of staff reduction at the Building Research Station. *The Observer* implies, however, that the DSIR, as a Government Department, cannot expect to escape economy cuts entirely. In our view the DSIR has had every right to expect annual and considerable expansion and it is more than sufficient sacrifice if some of the much-needed expansion has to be postponed or discarded. However, we have said these things before. Very much to the point is the suggestion in *The Observer* that the DSIR should have a Parliamentary Secretary of its own, 'able to speak expertly for it in the Commons, and to stand up for it when economies are under review.' At present questions in the Commons are answered by the Parliamentary Secretary to the Ministry of Works. The DSIR's position has been weakened by the present Government's preference for Lords President of the Council in the House of Lords. It was much stronger when Mr. Morrison as Lord President was able to speak for the DSIR in the Commons.

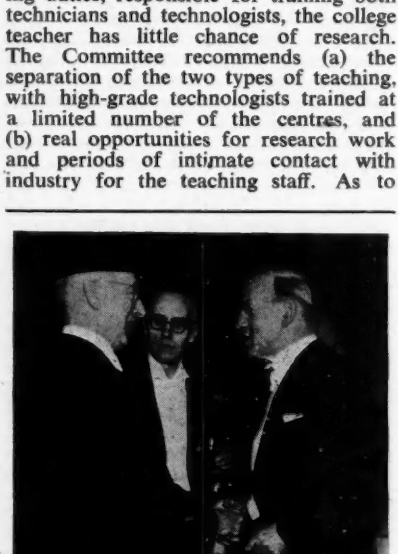
Penicillin Picture

ACCORDING to a recent survey in *Chemical Week* (70, 22, 69-70) penicillin in the United States is no longer a 'wonder drug' economically. The American penicillin industry has expanded to a 500,000,000,000,000-unit capacity but in the same period the price has dropped from $3 per million units to 12 cents. More than any other of the antibiotics, penicillin is made in other countries, with the result that U.S. export sales have not expanded at anything like the rate of expansion in world use of penicillin. In 1950 America exported 68,700,000,000,000 units; in 1952 exports are estimated at 75,000,000,000,000 units, a drop on the 1951 figure of 83,900,000,000,000. But with the fall in price, the value of exports in two years has come down from about $46,500,000 to $22,000,000. Costs of production have, of course, fallen appreciably. The days when penicillin was expensive were not days of scarcity price-fixing; prices were true reflections of high production costs. Even so, some producers are now working on a very thin margin. One well-known manufacturer has ceased to make bulk penicillin. It is possible that an ultimately stable market will be based upon 'the few low-cost manufacturers who can carry on.' Against this background of export and economic contraction, the market for penicillin as an animal-feed supplement—already accounting for $20,000,000 sales when all antibiotics thus used are considered—assumes a most important shape. It is a market that might expand to $50,000,000 sales in the next two years. However, it can never be a high-priced opportunity for penicillin or any other growth-stimulating antibiotic. It seems difficult to believe that only some twelve years ago the material needed to treat one patient for a few days took Oxford workers six month to make! Is there a more remarkable example of technological progress? Indeed, from the economist's or accountant's viewpoint, the rapidity of progress would seem to have been too great. It is difficult to recoup heavy capital expenditure when costs and prices fall so swiftly.

Metallurgical Training

THE Joint Committee on Metallurgical Education, set up seven years ago by the Iron and Steel Institute, the Institute of Metals, and other interested bodies, has issued a third report and one that is much more comprehensive than its predecessors. An outstanding conclusion is that our technical

colleges are not making an adequate contribution in turning out high-grade students, and this failure is blamed upon the standard of teaching. It is suggested that degrees in technology, technological universities, etc., are relatively futile panacea compared with the provision of good teaching staff. Nevertheless, the Committee does not feel that the staff problem is financial. Salaries in the technical colleges are described as comparable with those offered by universities. Whether this is a worthy criterion may be questioned—university salaries are not, after all, so munificent. The conditions in the colleges are regarded as less attractive; this, certainly, is an indisputable verdict. Over-burdened with teaching duties, responsible for training both technicians and technologists, the college teacher has little chance of research. The Committee recommends (a) the separation of the two types of teaching, with high-grade technologists trained at a limited number of the centres, and (b) real opportunities for research work and periods of intimate contact with industry for the teaching staff. As to the training of technicians, employers are urged to make it known that they will take account of awards their employees have won from recognised centres of education in deciding promotions. It is also suggested that the non-ferrous industry might learn a good deal from the Iron and Steel Institute in devising well-planned courses. If these are sound views, they are sharp criticisms of present standards and results.



Dr. F. A. Freeth, formerly director of research for I.C.I. (left), with Mr. H. W. Cremer, president of the Royal Institute of Chemistry, and Mr. T. McLachlan (British Association of Chemists), at the reception before the annual dinner of the British Association of Chemists (see CHEMICAL AGE, 67, 838)

Better Remuneration the Answer

ONCE again a consensus of practical opinion has sounded the warning that the creation of new teaching centres, whether called technological universities or not, will not produce startling results. Better staffed, better organised, and sufficiently encouraged our existing colleges and institutes could bring reasonably swift improvements. There is, however, a touch of complacency (or is it wishful thinking?) in the view that the recruitment and maintenance of first-class teachers is not partly a problem of pay. The acid test is the remuneration a first-class man would get in industry, and in these days of taut family budgets it is a test that individuals are obliged to make at frequent intervals. The times when such intangible rewards as status, a little more personal independence, and vacations were saving graces have gradually departed. Financial disadvantage may not kill a vocation but continued economic frustration can make a bad teacher out of a good one.

Metric System Recommended

TWO recommendations are being made by The Association of British Pharmaceutical Industry to its members. These are that liquid galenicals should be sold by volume instead of by weight and that solids, liquid galenicals, and pharmaceutical chemicals should be sold in metric weights and measures—the liquids by volume. These provisions are applicable to drugs and galenicals supplied for dispensing and are not intended to apply to pre-packed products for sale 'over the counter.' The 'target date' has been fixed for 1 July, 1953 (see CHEMICAL AGE, **66**, 714).

Rumania's Chemical Industry

An Authoritative Survey

By JOHN CARDEW

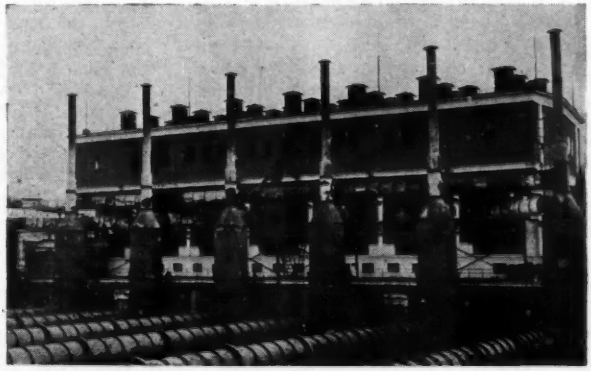
THE completion of three important new plants in recent months sheds a good deal of light on the progress being made by the Rumanian chemical industry. The projects are all part of the five-year plan (1951-55) at present governing the economy of the country and are designed to make use of indigenous raw materials, especially methane, and serve the growing demands of a large-scale programme of industrialisation.

Since the end of the war the chemical industry has had a high priority in Rumanian development plans. A separate Ministry of the Chemical Industry was set up some time ago, and investments allocated for the industry, under both short-term plans in 1949 and 1950 and the present long-term plan, have underlined the key rôle to be played by chemical production generally in the transformation of what was formerly one of the most backward states in Europe into a modern industrialised state.

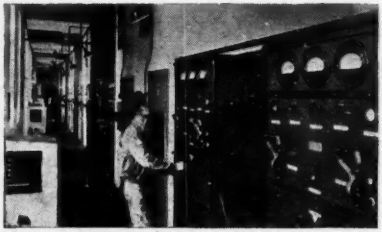
As a recent issue of a Rumanian foreign trade journal pointed out, 'the industrial processing of all materials is based today almost exclusively on chemical processing. Almost every metal process is based on the chemical transformation of natural ore and the same is true for almost all industrial branches. It was therefore an obvious necessity for Rumania to embark upon the development of a chemical industry, especially as the country has at its disposal very rich and varied resources of raw material.' Considerable emphasis has consistently been placed on the country's raw material supplies and the Premier returned to a familiar theme when he recently described them as 'inexhaustible.'

Reserves of coal, oil, natural gas, salt, clays of various kinds and numerous metals are indeed considerable and there is growing evidence that they are to become an important factor in the increasing economic co-operation that is taking place within the framework of the Council for Mutual Economic Assistance. This certainly is the significance of agreements just concluded between Rumania on the one hand and Hungary and Eastern Germany on the other. Both are based on joint use of Rumanian raw materials and provide for assistance to Rumania's chemical industry from more industrialised Hungary and Germany.

Since so many estimates of raw material reserves (such as the U.S. Paley Report) omit the countries of Eastern Europe, it is useful to have some idea of what Rumania, one of the most richly endowed in this respect, has. The country has the largest European oil reserves outside the Soviet Union. The richest fields, those at Ploesti, are, like the Polish fields, in the deep portion of the Carpathian sedimentary basin and the country is generally regarded as lying within the rich oil-bearing Mediterranean region



The 'Berea' factory which makes chemicals by processing methane gas



Control boards of the 'Berea' factory

centred on the Middle East. Before the war Rumanian wells produced about 9,000,000 tons of crude oil annually and the planned output in 1955 is 10,000,000 tons.

Another important Rumanian fuel and raw material for the chemical industry is methane, produced from seven dry gas fields in Transylvania. Production has been going on since 1913, and in 1946 was at the rate of over 22,000,000,000,000 cubic feet a year. In 1955, according to the five-year plan, the annual rate of production will be 3,900,000,000 cubic metres.

Coal fields exist throughout Rumania. They include chiefly pit coal and lignite and to a lesser extent anthracite. The most important deposits now being worked are in the Jiu Valley, the Trotus Valley and in the Banat. From 1953 the Jiu Valley coal industry is to produce special washed coal and semi-coke to supply the coke chemical factory now in an advanced stage of construction at Hunedoara. Natural bitumen is produced at Derna-Tatarus and two new installations to be built under the five-year plan for extraction with the aid of solvents are expected to raise annual production to 16,000 tons.

The wasteful use of such valuable raw materials as oil and natural gas for power production has been condemned by numerous Rumanian spokesmen in recent years, and an important aim of electrification plans now being carried out is to make more petroleum and methane available for other industries, and particularly the chemical industry, which is to use greater quantities as raw material. In 1950 power stations were annually consuming 500,000,000 cubic metres of natural gas and 250,000 tons of oil products 'so necessary for other needs of the economy,' as the Premier has put it. A considerable saving in the use of high grade liquid and gaseous fuels for power generation is to be effected by greater employment of low grade fuels—lignite, peat, coal waste and lumber chips.

Many metals and minerals have for long been exploited in the Western Carpathians and the Maramures, but exhaustive geological surveys of these and other regions are only now beginning to be made. Gold, silver, mercury, copper, lead, zinc, sulphur, mica, graphite, asphalt, ozocerite, bauxite, manganese and iron ore are all mined in important quantities. The extraction of chrome began for the first time in 1949 and although nothing is known of the results achieved, it is interesting to note the recent prediction of the state concern which handles exports of chemicals that sodium bichromate 'is going to hold an important place in our exports of chemical products.'

Rumanian salt was going to neighbouring countries as long ago as the 14th century and early exports went as far afield as India, Holland and Palestine. Deposits are virtually inexhaustible and are vaguely estimated at 'scores of billions of tons.' A more precise estimate given by one expert several months ago was that visible reserves of the seven mines then being worked could ensure at current rates of use all home and export requirements for at least half a century. Export rock salt has a 99.3 per cent sodium chloride content.

Reserves of Bentonite

Bentonite, the ferro-silicate of aluminium from which activated bleaching clay is made, exists in large reserves in the Banat and Transylvania, near Orsova and Hunedoara. The 'Phoenix' factory of the important Baia-Mare chemical combine in northwest Rumania processes the bentonite into a clay composed mainly of silica apart from aluminium oxide, iron traces, magnesium oxide and calcium oxide.

In addition to sulphur springs and springs containing sulphate of magnesium and sodium, Rumania has spas containing iodine and bromides. Limestone of good quality (one of the most widely used varieties of Rumanian marble is a crystal calcium carbonate completely free of moisture) is found in abundance as are numerous other materials used in the country's developing glass industry—quartz sand, felspar, lead oxide, pyrolusite, selenite, arsenic, anhydrite and barium salts. Finally the lagoons and lakes of the Black Sea shore contain radioactive mud.

In the economic stagnation and chaos of pre-war Rumania (there were some 300 soap factories in the country with a potential output several times the rate of consumption and plants were invariably located hundreds of miles from sources of raw materials) the chemical industry suffered more than many.

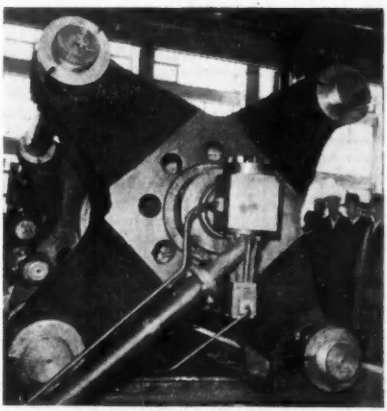
Not a Basic Industry

Apart from some small enterprises it hardly existed as a basic industry in any sense of the term and the only semblance to a pharmaceutical industry was a series of laboratories mainly engaged in packing or bottling imported products. Foreign capital was early attracted by the possibilities of chemical production in a country possessing many raw materials, and investment offers were frequently made to successive Rumanian governments. Nothing happened, however, and the country remained a market for foreign firms, especially the German trust I.G. Farbenindustrie, which bought raw materials and sold finished products. During this period chemicals accounted for something like 0.6 per cent of Rumania's total exports and 10 per cent of imports. The few factories that existed produced dyestuffs, some chemical preparations, pharmaceutical products and matches.

Immediately after the war plans were made to reorganise and modernise the existing chemical industry and set up many new branches. After 1948 when the plants were nationalised development on a big scale is said to have begun. The joint Soviet-Rumanian concerns ('Sovroms') which have been an important factor in the post-war growth of Rumanian industry are also said to have aided chemical production and some of the biggest early projects were carried out by the appropriate company, 'Sovromchim.' In addition to large quantities of heavy equipment, the Soviet Union gave technical assistance, and thus helped to overcome what was one of Rumania's most serious deficiencies. Chemical research institutes were established and have since co-ordinated their work with the requirements of the industry in a way and on a scale not previously known in the country.

By the end of 1949 the value of production in the chemical industry was reported to be 50 per cent above 1948. Under the country's first one-year plan a good deal of effort was devoted to modernising existing installations and the greatest individual increases in output were in previously established branches—caustic soda, sulphuric acid, lamp black and tanning materials. Even at this stage, however, main emphasis was on new construction and over half the investments made in the industry during the year went to the building, within the framework of 'Sovromchim,' of a big factory for ammonia, nitric acid and fertilisers, two plants to produce lamp black and four factories for tanning materials, as well as a number of other plants.

Extensions to old enterprises and the construction of new factories are also the basis on which the industry is to be developed under the five-year plan and



'Carbochim' plant for producing graphite electrodes, silicon carbide and grinding and polishing stones. The picture shows a 1600 press which, like all the equipment, was made in Rumania

overall production increased more than two and a half times compared with the 1950 level. Factories scheduled for construction during the five years are for the production of sulphuric acid, fertilisers, medicines, by-products of the chemical coke plant at Hunedoara and products from natural gas. The inorganic chemical industry is to be developed by increasing the annual capacity of soda-producing factories in Ocna-Muresului to 100,000 tons, by building a soda-ash factory with an annual output of 50,000 tons, by constructing two electrolytic caustic soda factories with a total yearly capacity of 15,000 tons, and by establishing two sulphuric acid plants capable of producing

75,000 tons a year. In the inorganic and processing industry a new combine will process the by-products of the chemical-coke plant into the intermediaries required for dyestuffs, medicines and plastics. Development of the plastics industry will be aimed chiefly at meeting the requirements of electro-technical and consumer goods production.

New Dyestuffs Planned

New kinds of dyestuffs are to be developed and manufactured under the plan and increased production by existing factories is expected nearly to double the 1950 output of dyes. A new factory is to turn out over 200 tons of medicines a year, including a wide range of synthetic pharmaceutical products. Products to be made in Rumania for the first time under the plan include electrodes for the iron and steel and chemical industries, magnesite for refractory bricks, synthetic tanning materials, DDT, penicillin, anti-TB drugs, anti-syphilis arsenicals, and vitamins. Measures to improve the indices of plant utilisation in aggregates are to concentrate especially on the production of electrolytic caustic soda and sulphuric acid. Provision is made for a 50 per cent increase in the productivity of labour engaged in the chemical industry, by raising the technical level of personnel, by introducing advanced technological methods and a greater degree of mechanisation. Emphasis in research work is to be on the chemistry of oil, coal and methane gas.

Following are the projected output figures for some of the main items as set for the last year of the five-year plan in 1955:—Soda ash, 57,000 tons; caustic soda, 52,000 tons; sulphuric acid, 143,000 tons; chemical fertilisers, 69,000 tons; tanning materials, 4,600 tons; organic dyestuffs, 1,720 tons; salt, 620,000 tons. One of the largest planned increases is in the case of chemical fertilisers, the 1955 target figure being something like 12 times the rate of production at the beginning of the plan.

The three chemical plants which have recently been put into operation are the 'Argesul' tanning materials factory, the 'Berea' plant in the Stalin region which is processing methane gas and the important 'Carbochim' plant to make electrodes. The latter two have been established in already industrialised areas, but the 'Argesul' factory, named after the river Arges on which it is built at Pitesi, west of Bucharest, has been sited in accordance with a policy of extending industry to areas where raw materials exist close at hand.

Construction of the factory began two years ago. It is one of the first entirely mechanised concerns designed wholly in Rumania and completely equipped with Rumanian-made machinery. The capacity of the factory has not been revealed, but its commissioning is said to have made Rumania self-sufficient in mineral tanning substances and prepared the way for an exportable surplus to go to other East European countries.

The 'Berea' plant was built to Soviet designs with the help of specialists from the Soviet Union. Equipment also came from the Soviet Union and the production process is completely mechanised. The factory is one of the biggest of its kind in south-eastern Europe and is described as having opened 'new possibilities for the development of the Rumanian chemical industry' by putting one of the country's greatest natural resources to use as a raw material instead of as a fuel. As in the case of the 'Argesul' factory, the opening of the plant was followed by an announcement that provision was being made to export surplus production.

'Carbochim' Plant

The 'Carbochim' plant in Cluj, industrial centre of Transylvania and Rumania's second largest city, was begun in 1949 and its completion in September was said to have been two years ahead of the original schedule. The plant is producing graphite electrodes, silicon carbide and grinding and polishing stones, all of which formerly had to be imported. It covers an area of over 40,000 square metres and was designed and constructed entirely by Rumanian technicians. All the machinery and equipment were also manufactured in Rumania, much of it in Cluj.

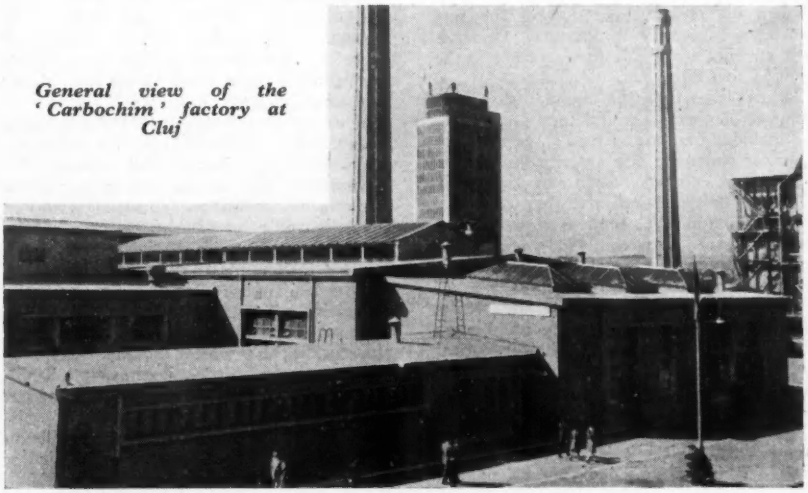
Agreements concluded by Rumania with Hungary and Eastern Germany follow earlier similar arrangements entered into by various groups of Eastern European countries. For several months now the production of rolled metal has been rationalised on the basis of each country concentrating on a particular profile and subsequent exchanges being made. Similarly, Hungary and Czechoslovakia have for some time had

an agreement under which the Czechoslovaks process some of Hungary's bauxite. It seems clear that when the Hungarian deputy Minister of Foreign Trade revealed in November that 'these agreements will be followed by similar agreements in relation to other goods' he had chemical production in mind, and the agreements already entered into by Rumania with the Hungarians and East Germans. Main features of these agreements are:—one country places part of its natural wealth at the disposal of the other country until the raw material is exhausted or its utilisation in this way becomes superfluous; the two sides jointly produce materials and industrial equipment necessary for the carrying out of the agreement, assist each other in planning and in exchanging technical experience; one of the sides supplies industrial equipment on credit.

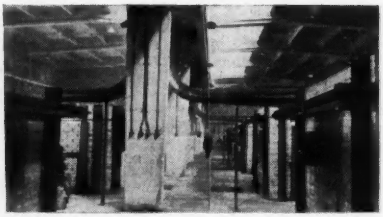
Thus the Rumanian-Hungarian agreement sets up a joint company, 'Romagchim,' to build in Rumania a chemical combine for exploiting natural gas. Further, the company is to construct a pipeline to Hungarian territory where it will be used by a chemical plant to be built by Hungary. Hungarian machinery will be supplied for the Rumanian chemical industry and the high-tension electrical networks of the two countries will be linked on a local scale. Imports from Hungary, it is said, are to increase Rumania's output of soda and products made from soda to supply both countries.

The Rumanian agreement with Eastern Germany, announced several months after the signing of the Rumanian-Hungarian agreement, provides for the setting up of a mixed Rumanian-German Society to utilise 'on a parity footing' raw materials available in Rumania, and necessary for the development of the Rumanian chemical industry. Eastern Germany will supply equipment and Rumanian deliveries to Germany are to include crude and concentrated ores and chemical and metallurgical products. Like the Rumanian-Hungarian arrangement, the agreement with Germany will give the Rumanian chemical industry special access to the heavy products of a more industrialised country. Given Eastern Germany's well established and diversified basic chemical industry and Rumania's raw materials, plus the present tempo of industrial development in Rumania, formation of the mixed society can be expected to expand Rumanian chemical production considerably. Already, prior to the new agreement, Eastern Germany had supplied chemical equipment to Rumania, including installations and laboratories for oxygen works. Chemical equipment was also prominent at an East German industrial exhibition held in Bucharest last summer.

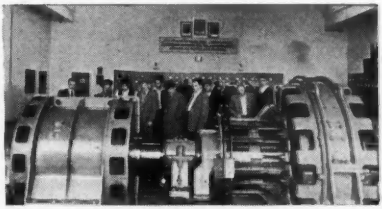
Rumanian interest in increasing exports of chemicals, especially to Western countries,



General view of the 'Carbochim' factory at Cluj



The ventilation system at the 'Carbochim' factory



Visitors inspect Rumanian-made equipment in the 'Carbochim' factory

has been evident for some time and English-language foreign trade journals sent abroad have been emphasising the growing range of products becoming available for sale in all markets. Whereas output in the oil industry for instance, was formerly restricted to one or two basic products, a whole range is now being supplied for chemical, pharmaceutical and industrial uses—natural bitumen, paraffin wax, medicinal and industrial vaseline, petrol coke for the manufacture of electrodes and naphthenic acid. In fact the short list of traditional Rumanian export chemicals—caustic and calcined soda, sulphuric acid, alcohol and lamp black—has been enormously expanded according to the state export concern 'Chimimport.' In recent years new markets have been found in neighbouring East European countries and considerable possibilities seem to be opened up for the Rumanian industry through the recent conclusion of the first Sino-Rumanian trade agreement. Under it both chemicals and oil products are to be supplied to China.

At the same time the country is still an importer of chemicals, and they are said to be included among China's exports to Rumania under the new agreement. During the Moscow economic conference last April, Rumanian delegates indicated their country's interest in importing chemical products, and declared that between 1953 and 1955 Rumania could buy from Britain, Austria and Switzerland, chemicals to the value of from 100,000,000 to 150,000,000 Swiss francs. Imports in which they are known to be most interested are pharmaceutical substances, dyestuffs and pigments, etheric oils, natural and synthetic plastics, chemical fertilisers, insecticides and fungicides.

Wood, animal and mineral products are among those which, it is claimed, are now being made from indigenous natural resources. Most of them have been important inclusions in Rumanian displays at international trade fairs held during the past few years in Prague, Leipzig, Vienna and Milan. Those being exported include:—

Wood products: Glacial and industrial acetic acid, formaldehyde, methyl acetate, active carbon, acetone, methyl alcohol.

Salts: Sodium bicarbonate, sulphite and bisulphite, calcium carbonate, caustic soda and soda-ash.

Animal products: Lactic acid, casein, trisodium orthophosphate, hide glue, industrial and pharmaceutical glycerine, stearin and oleic acid.

Vegetable products: Amyl alcohol, ethyl alcohol, and a whole series of solvents, especially butyl alcohol and amyl acetate.

Methane gas products: Lamp black, ammonia gas.

Mineral products: Bleaching clays (activated with hydrochloric or sulphuric acid), litharge, red lead, sulphuric acid (made from pyrites by lead chamber or contact methods), sodium bichromate, silver nitrate and talcum in several grades.

Pharmaceutical products: Calcium gluconate, calcium chloride for injection solutions, saccharine, pure glucose, lead acetate.

Numerous serums and vaccines are now being produced on an industrial scale in Rumania and most are export commodities. Tests by the Rumanian Ministry of Health are said to have demonstrated the superiority over similar products of antigens for the diagnosis of syphilis (Bordet, Citochol, Meinike and Kahn). Other specialised pharmaceutical products include Hexaphosphate (tonic on an organic phosphate basis), Cuprifer (tonic, in pills, on an iron, copper, liver-extract and vitamin B complex basis) and Sintofolin (a synthetic product with an effect similar to that of natural follicular hormones, for injections and in tablets).

Selling & Market Research

An Important Aspect of the Chemical Industry—Part I

WHEN one of the prominent leaders in the chemical industry of the U.S.A. asserts that 'selling may well be the one major effort in our national life destined more than any other to save us from economic collapse,' we may at first sight regard this as closely akin to rhetorical hyperbole. But with further reflection and a study of the context we must agree there is little or no overstatement by Mr. J. Warren Kinsman, vice-president of E. I. du Pont de Nemours & Co. Selling is the final act in a long chain of activities all of which are essential, but useless without this crowning consummation.

The present position in the chemical, as in most other industries, is undoubtedly difficult and likely to become more difficult from the point of view of sales, especially in foreign markets. This has long been foreseen by our leading chemical manufacturers. Among other things one cannot of course say how long the abnormal demand due to defence programmes is likely to last; but the possibility of its decline must be faced.

Competitive Powers

There can, however, be little or no uncertainty about the rapidly rising competitive powers of Germany and Japan in international markets, to say nothing of those of other countries—France, Italy, Belgium, Switzerland, and even Russia—all bent on securing their share. Moreover the political obstacles to trade with Eastern Europe and also China—formerly such valuable markets for many branches of chemical production—are as great as or greater than the economic and competitive resurgence of Germany and Japan.

Before the war much ingenuity was exercised, and on a fairly large scale in some directions, to minimise the intensity and force of international competition in the chemical fields by means of price agreements, cartels, allocation of markets, etc. But the present position and prospects in this matter are quite obscure and indefinite; or at least, so far as they can be understood, are unfavourable, especially in so far as the American anti-trust laws are a relevant factor. Indeed these seem to be as lynx-eyed and ubiquitous as ever in ferreting out anything that in the slightest degree approaches that vague and mysterious evil 'restraint of trade,' or threatens that sacrosanct ideal 'free competition.' One ventures to think that both these ideas need re-examination and clarification in the light of modern conditions.

Tariff Difficulty

Another difficult and complex factor in the international situation is concerned with tariffs. Despite strenuous efforts and some results at the Torquay conference, there have been few substantial concessions or reliefs, and especially where they are probably most needed. With the ardent dreams of many countries in respect to self-sufficiency it would seem that protective tariffs are likely to rise rather than fall. Thus it would seem that we are driven to rely mainly on trade agreements with different countries based on preferential tariffs or mutual rebates for some amelioration in the midst of unrestrained competition and rising tariffs.

Under these circumstances, from the point of view of any one country, our own for example, it seems obviously sound policy to 'unite for strength,' to co-operate more closely, with a minimum of competition in the home market, in order to strengthen ourselves to the utmost in the international markets. Among other things the greatest possible support should be given to such bodies as the Association of British Chemical Manufacturers. In this connection it may not be amiss to suggest that even big business should not remain too aloof, overconfident in the assumption that it can go forward indefinitely by its own strength. The sincere and earnest co-operation of all, from the largest to the smallest units, is essential, under present world conditions, to ensure the stability and well-being of the whole of British chemical industry. Such co-operation can of course take many forms, and is not limited to export sales.

Reverting for a moment to the subject of tariffs, it seems unlikely that, although the so-called phantasy Free Trade may still

remain a political ideal in some quarters, it will have any practical effect on British policy aiming at some form of protection for the chemical industries if the need arises. It was never free trade, in the true sense originally envisaged by Adam Smith; but merely free imports and dumping. Trade means both imports and exports, and so far from our export trade being free it was hampered and shackled by high tariffs in most foreign markets. If then export trade was so fettered how can one speak of free trade? And only by having tariffs ourselves can we effectually bargain for bilateral tariff-reducing agreements with other countries. It is to be devoutly hoped that this blind and stupid delusion of imaginary free trade and the endless controversy based on false assumptions are now quite dead and deeply buried. As to real free trade (instead of false) that of course is an ideal, possibly remote at present.

Complexity of Chemical Industry

It is hardly necessary to stress the manifold complexity of chemical industry, and its many special features that must be closely studied from the point of view of salesmanship. This has already been done times enough both here and abroad. There is, however, one feature that urgently calls for close examination and clear thinking. In fact there are two features: firstly the nature and extent of supporting publicity in foreign markets, and secondly the matter of technical training and background in the chemical salesman. As to the latter we are apt to go to extremes and suppose that technical training is everything or nearly so, and mere old-fashioned selling technique little or nothing: a frightful mistake.

But first, as to supporting publicity, we may consider our technical literature, both books and periodicals, in the light of ambassadors of trade in foreign countries. How do they shape in this respect? To those familiar with American trade and technical journals, the comparison with our own must often appear at least somewhat humiliating not to say painful. Such unfavourable comparison is still more marked and formidable from examination of recent German chemical publications. All the leading chemical firms and indeed many of the smaller ones freely and largely advertise, contribute readable reports on their activities; and all in all combine to aim at presenting to the world a picture of enterprise and efficiency. Are they not invaluable aids to, and ambassadors of trade?

Our own engineering and chemical firms might well review their publicity policies and compare their efforts with those of their German and American competitors. Surely, one may suggest, no one with experience in the field of international trade can deny that the overseas buyer's impression of a country's industry is very largely created by reading its trade and technical journals. While the quality of the editorial contents of British publications and the quality of British products are second to none, our industrial organisations lag well behind those of other countries in their use of advertising. Our direct selling methods may be reasonably efficient but we are far behind in the matter of Press publicity.

The firms in the chemical and allied industries would also be well advised to consider the advantages of co-operating in direction of chemical trade literature in foreign markets, possibly in conjunction with or through such bodies as the Association of British Chemical Manufacturers or the British Chemical Plant Manufacturers' Association. Most firms individually are fully alive to the obvious importance of supporting publicity for their overseas salesmen, agents and associate firms, and of having their trade literature in the appropriate foreign language. But is it not possible that there is considerable further scope for joint enterprise without sacrifice of that 'sturdy individuality' which must in any case be preserved?

Technical Training

On the subject of the right type of salesmen and their training and background in the chemical industry a vast amount has been written and spoken. In numerous recent articles and symposia on the subject in the U.S.A., emphasis, as one would expect, has been largely directed to the supreme importance of technical training. Not only the background but much of the fore ground—indeed the whole realm of training—should be technical. The salesmen must be real chemists and chemical engineers, even research workers and the highest executives from president or chairman downwards must make frequent personal contributions; that is to say, lead in the van of overseas salesmanship.

But despite this necessary emphasis on technical and scientific backgrounds it is well sometimes to remember that there are many other items in the salesman's mental and spiritual equipment that are equally essential. Mr. J. C. Leppert, vice-president of the Mathieson Chemical Corp., has recently pointed out that these include: good personality, alert, inquisitive and analytical mind; ability to think and act quickly; a strong competitive urge; and certain fundamentals which any good sales department can teach.

Francis Bacon has said something about 'reading maketh a full man' with the implication that he may sometimes be tongue-tied and unable to marshall his facts to advantage. Some of the recommended fields of study for which the salesman must surely have to burn the midnight oil are so formidable, not to say encyclopaedic, that there seems little chance of being other than 'a full man.' In addition to his technical knowledge—which alone involves a vast amount of study—he must be conversant with (a) production and shipping problems, (b) qualities, uses and potentialities of his products and competitive products, (c) the general competitive situation, (d) industries using products, (e) chemicals generally bought in territory, (f) possible openings for extending company's manufactures, (g) general industrial problems in territory, (h) general developments in chemical industry, (i) packaging, transport, etc., (j) commercial law, tariffs, special regulations affecting his products and branch of chemical industry. In addition he must maintain close collaboration with the research, development, service and information departments, including of course market research where this is a separate and specialised function.

If he has any spare time there is always that 'thorough grounding in psychology' that is often thrown in as a more or less basic essential.

(To be Continued)

Annual Subscription

Commencing 1 January, 1953, the annual subscription to THE CHEMICAL AGE will be increased to 42s. for both home and overseas readers. A single copy will sell for 1s., 1s. 3d. postage paid.

Melchett Medal, 1953

Dr. Harold Hartley Honoured

THE council of The Institute of Fuel has unanimously agreed to award the Melchett Medal for 1953 to DR. HAROLD HARTLEY, C.B.E., in recognition of his high scientific attainments in the development of domestic heating appliances coupled with the administrative skill with which he has guided a great industrial organisation devoted to the practical efficient use of fuel.

Dr. Hartley graduated head of his year in chemistry at Manchester University in 1907 and was elected to a Gartside Scholarship of Industry and Commerce, and after a year spent in the School of Economics at Manchester he visited Norway and Canada to study the production of power for electrochemical industries. Returning to England, he worked for three years as a Gas Research Fellow at Leeds University under the late Professor W. A. Bone.

In 1912 Dr. Hartley was appointed chief chemist to the Richmonds Gas Stove and Meter Company, where he built up a technical and research section and continued the work on the measurement of the radiant efficiency of gas fires which had been started at Leeds in 1908. In 1919 he was awarded the degree of D.Sc. of Manchester University, and the same year he was appointed head of the research department of Radiation Limited, on its formation. At the new Central Research Laboratories in Grosvenor Place, London, he directed many important investigations into the design of gas-fired appliances including those culminating in the producton of the Bennett/Hartley integrating radiometer for determining the radiant efficiency of domestic heating appliances. He was elected to the board of Radiation Limited as technical director in 1938, became deputy chairman in 1948, and succeeded to the chairmanship in 1949.

Besides serving as President of The Institution of Gas Engineers (1947-48), Dr. Hartley has been chairman of the council of British Cast Iron Research Association and, in 1945-47 president of that body. He is president of the Institute of Vitreous Enamellers, and is also one of the DSIR Visitors to the British Coal Utilization Research Association. He has been a Member of The Institute of Fuel since 1944 and was elected a Fellow in 1848.

Kiln Drying of Timber

Problem of Staining by Chemical Changes

STAINING and discoloration sometimes occur during the kiln drying of timber and may be caused by chemical changes in the wood or by the growth of fungi.

Precise knowledge of the nature of the chemical change and definite means of preventing the staining are lacking, but useful information to help in overcoming this form of degrade is given in the 'Kiln Operator's Handbook,' by W. C. Stevens, M.A., A.M.I.Mech.E., and G. Pratt, published for the Forest Products Research section, Department of Scientific and Industrial Research (HMSO, 10s. 6d.).

Most woods darken in colour in varying degrees owing to the use of elevated temperatures during kiln drying. Frequently the discoloration is due to oxidation of some constituents of the wood substance and at some temperatures darkening is also caused by the combined effect of temperature and moisture (hydrolysis) on the wood.

Discoloration Occurring

In certain species, of which sycamore is a notable example, a general discoloration occurs throughout the timber even when it is kiln dried at moderate temperatures, and this is thought to be due to changes brought about by the action of enzymes in the wood.

On dismantling piles of certain species of timber after seasoning it is sometimes found that where the piling sticks have been in contact with the wood there are distinct bands different in colour from the rest of the surfaces. Occurrence of these 'sticker marks,' as they are often called, may at times be attributed to the use of dirty, mouldy and wet sticks or sticks of a species with an acid content, such as oak.

In the kiln drying of some species, such as iroko and sycamore, even when they are piled with clean dry sticks, well defined stick marks may develop which penetrate so deeply into the material that they are not removed by normal planing.

This form of staining is due to the chemical changes taking place immediately beneath the sticks, where air is more or less excluded and hence the initial drying is slow, differing from those changes which occur in the fully exposed surface zones. In iroko, for instance, it is thought that tannins interact with calcium salts in this species to a much greater extent under the sticks, where warm moist conditions persist for a considerable time, than elsewhere.

The volume deals with all problems likely to be encountered by a kiln operator and covers kiln seasoning and design, operator's equipment and kiln instruments; preparation of a load for kiln drying; operation, maintenance and testing of a kiln, and so on. There are a number of charts, diagrams and tables and eight plate illustrations.

Removal of Restrictions

AS announced by the Parliamentary Secretary to the Board of Trade in the House of Commons on 12 December, 1952, orders have now been made revoking the Copper & Zinc Prohibited Uses (Board of Trade) Order, 1951, as amended, and the Copper & Zinc Prohibited Uses (Ministry of Supply) Order, 1951, as amended. The new orders came into operation on 18 December. The effect is to remove restrictions which had been in operation since early in 1951, on the use of copper, brass, and other copper alloys in manufactures for the home market. Restrictions on alloys which contain nickel will continue; their use is still prohibited in a wide range of articles by the Nickel Prohibited Uses (Board of Trade) Order, 1951, as amended, and the Nickel Prohibited Uses (Ministry of Supply) Order, 1951, as amended.

Another Anti-Trust Suit

LAST week the United States Government filed suits against three of the largest soap manufacturers in America alleging that they were violating anti-trust laws. The companies concerned were Lever Brothers of New York, Colgate-Palmolive-Peet of Jersey City, and Proctor and Gamble of Cincinnati. They are said to have cornered at least 75 per cent of the household soap market and about 90 per cent of the detergent business. The Government is asking that the companies be broken up into 'separate, independent organisations.'

Following the filing of the suits the heads of all three companies made statements denying the allegation that they had violated anti-trust laws. The president of Proctor and Gamble said that he was confident that legal proceedings would prove that the Governments' charges were unfounded.

Watford Chemical Company's Dinner

Dr. Kurt Wallersteiner Again Host

SOME 80 senior employees, especial friends of the Watford Chemical Company Ltd., attended the firm's annual dinner at the Oxford and Cambridge University Club, Pall Mall, London, on Friday, 12 December, when Dr. K. S. Wallersteiner, technical director and founder of the firm, was host. Among the guests were J. W. Whitlock, J.P., M.A., Ll.D., Mrs. M. K. Gardner, Economic Officer at the American Embassy, Dr. H. Weddigen, German Commercial Attaché, a number of representatives from firms doing business with the company and the editors of a number of trade and technical journals.

Welcoming the guests, Dr. Wallersteiner said that every year they looked forward to greeting their friends to whom they had little chance to say more than 'hello' during the year. It was a great pleasure for him to be able to wish them all a very Happy Christmas and a Pleasant and Prosperous New Year.

Replying, Mr. Widlock told the company that he was a personal friend of Dr. and Mrs. Wallersteiner. They were both charming people. Dr. Wallersteiner was a very busy man and he seemed to spend a great deal of his time in the far-flung corners of the world. He was overflowing with ideas and was really an amazing individual.

Proposing the toast to the company, Mr. Bob Edwards said that it was very unusual for a trade union bureaucrat to be asked to propose such a toast. But then the Watford Chemical Company was an unusual company with a wide range of activities and with an unusual management. They paid well over trade union rates and were highly satisfactory employers. He hoped they would have a good year in 1953. After quoting figures to support his claim that a world slump was developing, Mr. Edwards said that Dr. Wallersteiner, one of the big names in the chemical industry, was pioneering barter trade and he wished him God's speed in this work.

Mr. G. M. Todd, chairman of the company, said that he was a chartered accountant and he could remember the day when Kurt Wallersteiner came into his office and said that he wanted to form a chemical company. This had only been a few years back but now they had associates in many of the principal countries of the world. Dr. Wallersteiner was the most brilliant man he had ever met and it was mainly due to him that the company was what it was. Mr. Edwards had referred to 1953 and had mentioned a slump but the Watford Chemical Company was always looking ahead to the future and Kurt Wallersteiner was always thinking of what he could do to strengthen the company. He had recently visited Pakistan where he had seen people starving, so he devised a scheme, involving four companies, whereby the people of that country could get wheat even if they had no money.

Mr. Todd said that the company's progress was also largely due to its employees.

The top table at the dinner

Their managing director was now on loan to a company in Canada which would bear the name 'Watford' and which he believed would bring them credit. He also mentioned Miss E. E. Byrne, joint-secretary, who had been with the firm since its formation in 1942.

Miss Byrne said that like the acorn the firm had grown from small beginnings into a giant with branches in many overseas countries. She thanked all employees for their loyal service.

Fused Caustic Soda

RECENT developments in the technique of making fused caustic soda were the subject of a paper delivered by Dr. G. J. Lewis to a joint meeting of the North-Western Branch of the Institution of Chemical Engineers and the Liverpool Section of the Society of Chemical Industry held in Liverpool on Saturday, 13 December.

The author described many methods of making fused caustic soda and included a method involving the evaporation under vacuum of concentrated caustic liquor by Dow-therm vapour. An old process was the evaporation of solutions of caustic soda in open pots heated over fires but this was unpleasant and inefficient. The caustic soda attacked the cast iron pots and impurities in the liquid had to be allowed to settle before the fused caustic soda could be ladled out.

A more efficient way of evaporation was the cascade system but this required much space. Evaporation of water at a high temperature was avoided by the Acker process of manufacture, by extraction of a concentrated caustic liquor with liquid ammonia and by a partial pressure evaporation of a liquor-kerosene mixture. Water had been evaporated from solutions of caustic soda in pots under vacuum. The properties of caustic soda solutions were considered.

Evaporation of concentrated caustic soda solutions in a nickel evaporator under vacuum by Dow-therm vapour was described. Forced circulation of the liquor through the tubes of the evaporator was not advantageous, natural circulation was therefore practised. Sodium chlorate in the hot liquor corroded the tubes of the evaporator but this could be stopped by treating the liquor with reducing agents, iron or sugar, and by preventing air from entering the caustic solution or the evaporator during evaporation. This method of evaporation gave a product of high quality and good colour.

Five Films About Oil

A PROGRAMME of five films about oil was shown simultaneously at a number of major London cinemas on 10 December to about 11,500 stockholders, friends, staff and Press representatives at the invitation of the Anglo-Iranian Oil Co., Ltd.

'Oil for the Twentieth Century' traces the story of the company's progress from William D'Arcy's first attempts to exploit oil in Iran in 1901, through the two world wars, to the ever-growing demand for oil today. The story of the development of the oil tank ship from the sailing vessels of the mid-nineteenth century up to the modern tanker was given in a short technicolour cartoon.

'Rig 20' tells the story of the fire which broke out when drilling the oil well at Naft Safid in 1950, the first fire in fifty years of drilling in Persia. The battle which ensued for five weeks, against fire and gas then, and the remarkable shots of the upward rush of half-a-mile of steel pipe has made an enthralling fifteen-minute film and was awarded a first prize at the Venice Film Festival of 1952.

A technicolour film of the life led by British and Persian employees of the company and a ten-minute film showing some of the activities carried on throughout the world by the company at any given moment completed the programme.

Form Canadian Company

A company has been formed and has commenced operations in Canada under the title of Kent-Norlantic Limited, at Horner Avenue, Toronto 14. This organisation takes over from the parent company, George Kent Limited, the responsibility of marketing throughout Canada, Kent industrial instruments, certain other products, and the Norlantic range of domestic and industrial water and steam meters. Arrangements are being made for the manufacture and assembly in Toronto of the Norlantic range and other products, and for stocks to be held to meet Canadian delivery requirements both of new equipment and spares. The company will operate a comprehensive organisation to cover after-sales service.

Developing a Basic Chemical Industry

Mexican Progress since the War

MEXICO'S chemical industry, which was controlled by German capital in the early part of the century, has made great strides since 1939. The number of workers employed rose by 156 per cent between 1930 and 1944 although employment in manufacturing industries generally during that period increased by only 85 per cent.

In spite of this development imports of chemicals increased in 1945-1948 by more than 100 per cent over the period 1925-1929. The Government has therefore decided to make greater use of the country's ample natural resources, and mainly through the National Financiera, is building up a basic chemical industry.

Initial steps have been taken, by the establishment of production of alkalis, sulphuric acid and fertilisers. Output of all these is already considerable.

In the fertiliser field, 70,000 metric tons of ammonium sulphate are being produced in one plant near Mexico City, using gas piped in from the Poza Rica oilfield.

Output of standard superphosphates (less than 25 per cent concentrate), using mineral phosphates which are imported chiefly from the U.S.A., is also being increased.

Domestic Market Supplied

Enough sulphuric acid is probably being made to supply the domestic market. Production is being increased to ensure the output of larger quantities of fertiliser. Manufacture is centred in nine major plants at the moment, fairly well distributed throughout the country.

Four new plants were established between 1947-1951, with a combined capacity double that of all the plants in operation up to 1947. At present, these four plants account for 70 per cent of total national production, and several of them intend to enlarge their production capacity. The demand for sulphuric acid is increasing constantly and important new discoveries of sulphur deposits will encourage this development.

Capital investment in plants to produce sulphuric acid is estimated at 30,000,000 pesos, the largest single investment being 10,200,000. Approximately 49 per cent of this total capital is owned abroad, according to Mexican sources.

Most of the sulphuric acid produced is the 98 per cent industrial grade. The industry has been using 15 per cent of imported sulphur, but the need for these imports is disappearing. The price of sulphuric acid is frozen by the Government at 214 pesos per metric ton.

Before 1939, Mexico imported between 12,000 and 15,000 metric tons of fertilisers a year, principally Chilean nitrates, which were used almost entirely for cotton, sugar and winter vegetable crops.

Fertiliser Demand

With the rapidly expanding production of all these, fertilisers have assumed a new significance and the demand in the north of Mexico is increasing rapidly. In 1946, total yearly consumption of fertilisers was estimated at less than 30,000 metric tons for the whole country.

A large producer, Guanos y Fertilizantes, S.A., organised by Nacional Financiera with a capital of 10,000,000 pesos, later increased to 30,000,000, has built three plants which produce separately chemical fertilisers (ammonium sulphate), standard superphosphates, and fertilisers of guano mixtures.

Total annual capacity of these three plants is 70,000 metric tons. Other plants already in operation produce about 8,000 metric tons of standard superphosphates a year. The total capacity of 80,000 tons of fertilisers includes about 40,000 tons of standard superphosphates. Although Mexican agriculture is using twice as much fertiliser as before the last war, production is considered to be under requirements.

Production of alkalis was not established in Mexico until recently. Total investment in the production of alkalis is 25,000,000 pesos—20,000,000 in one plant, Sosa Texcoco, S.A. and a total of 5,000,000 in three other plants, all of them situated close to

or in the district surrounding Mexico City. Total installed capacity is:

	Metric tons a year
Caustic soda	15,000
Sodium carbonate	38,500
Bicarbonate of soda	59,000
Sodium chloride	3,600
Potassium chloride	360
Hypochloride of calcium	16,000
Lime	18,000

Most of the caustic soda is produced as a 40 per cent solution, and 50 per cent solution occasionally. Solid sodium carbonate is available with a purity of 98.5 per cent.

Alkali producton does not satisfy domestic demand. During 1949, a year of peak production, only 33 per cent of the domestic market was supplied by Mexican plants. The production of caustic soda will be increased by 2,000 metric tons a year with the establishment of Celulosa Nacional, S.A. The price of alkalis produced in Mexico is considered high.

Dean & Stark Apparatus

Important Changes in Specification

TWO years of technical discussions have preceded the publication by the British Standards Institution of a completely revised edition of B.S. 576, covering apparatus for the determination of small quantities of water by the Dean and Stark method of distillation with an immiscible liquid.

This type of apparatus is specified in no fewer than 30 British Standards (listed in the foreword) on industrial and laboratory test methods for petroleum products, tar products, paints, oils and fats, coal and coke, rubber and other materials. It is also specified in the 'Standard Method' handbooks of the Institute of Petroleum and the Standardisation of Tar Products Test Committee, in the British Pharmacopœia, and by other standardising bodies.

The apparatus now specified is claimed to be improved in many respects, and will be found satisfactory by the majority of users.

Important changes made since the 1939 edition are as follows:—

1. One size only of condenser is specified, with a jacket length of 25 cm. in place of the previous 20 and 30 cm. sizes.

2. The connection between condenser and receiver is a B19 standard ground glass joint, whereas previously a B16 joint and a cork connection were offered as alternatives.

3. The sizes of the ordinary (Type 1) receiver included are 10, 25, and 100 ml. with stopcock, and 2, 7.5 and 25 ml. without. For most of these, a choice is provided of standard joint or cork for the connection to the distillation vessel.

4. Because of complaints that a 70 mm. separation between the vapour tube and the body of the receiver may lead to the base of the receiver becoming unduly hot, the 150 mm. separation originally specified in 1936 has been adopted for all sizes except 2 ml.

5. The Type 2 receiver previously included has been replaced by that specified by the Institute of Petroleum for the determination of motor fuel diluent in crankcase oil, which may also be used for the determination of water, using a heavier liquid such as trichlorethylene or perchlorethylene. Since these liquids have the advantage of being non-inflammable, this modified receiver (which is specified in 3 and 12.5 ml. sizes) may be preferred in many laboratories.

6. Full information on construction, dimensions, graduation, and tolerances and detailed drawings are included, but, in accordance with current practice in British Standards for volumetric glass ware, only the essential dimensions are listed as mandatory, the remainder being included for the guidance of manufacturers.

Copes of B.S. 756: 1952 may be obtained from the British Standards Institution (sales branch), 24 Victoria Street, London, S.W.1, price 4s.

Oil Content of Soybeans

A new method of determining the oil content of soybeans has been developed by the U.S. Department of Agriculture in co-operation with Seedboro Equipment Co., of Chicago. Results on a single sample of soybeans have been obtained in about 15 minutes. The method involves the use of a high-frequency oscillator for measuring the quantity of oil in a solvent. Soybean samples are ground in a special grinder extractor with an oil solvent; the solvent containing the oil is then filtered and placed in the cell of the electronic oscillator which measures its di-electric properties. The reading is converted to percentage of oil by means of a conversion table.

Soil Research in Scotland

Year's Work of the Macaulay Institute Reviewed

INCREASING interest in the work of the Macaulay Institute for Soil Research was referred to at a meeting of the council held at Graigiebuckler on Friday, 5 December, with Professor J. R. Matthews in the chair.

Submitting the annual report, Dr. Murray Macgregor, convenor of the staff committee, said that a large number of visitors from many parts of the world had been welcomed during the year.

Post-graduate research workers from Australia, South Africa, New Zealand and Iceland, were at present studying at the institute and during the period under review three students had graduated Doctor of Philosophy in the University of Aberdeen, the institute being a recognised centre for research.

The deputy director, Dr. A. B. Stewart, had recently returned from the U.S.A., where he had been a guest speaker at a symposium on soil and fertilisers.

Effective Co-operation

In a review of the work of the staff, Dr. Macgregor referred to the effective co-operation between the Institute and the Scottish colleges of agriculture, whereby the result of fundamental research were made available to the farming community. The demand being made on the laboratory accommodation was stressed by Professor Phemister in his report on the site and buildings.

A summary of the departmental work showed the following progress and activities:

Among the X-ray investigations the study of the mineralogy of Scottish soil clays was continued. Clay fractions from Norwegian and Turkish soils were also examined. Investigations into the weathering of granatite were continued and samples of nontronite from different localities were compared.

In the physico-chemical section work had continued on the differential thermal analysis studies of Scottish clay soils, and the results compared with X-ray data. The distribution of clay minerals and the trends down the profiles had been examined for various soil types. In addition to soil clays, nontronites, dolomites and sulphides from various localities had been examined.

On the chemical side, work on the best method for removal of free iron oxides from clays was practically complete, while investigations had been extended to the products of grinding muscovite. More promising results from the electrophoretic method of separating clay minerals had been obtained.

Thermal Analysis Results

International co-operation in correlation of thermal analysis results had continued and considerable advance had been made. This subject was one discussed at the 19th session of the International Geological Congress in Algiers, attendance at which was possible through facilities granted by the Agricultural Research Council. A set of three lectures on clay mineralogy and soil science were delivered in Spain on the invitation of the Consejo Superior de Investigaciones Cientificas.

Determination of alkali and alkaline earth metals by flame photometry (11,000 samples) and flame emission spectrographic methods (2,000 samples) had been continued in the spectrochemistry department. Trace elements in soils, plants and biological materials had been determined by the cathode layer arc technique; some 1,800 samples had been examined for up to 16 constituents.

Work on improvement of spectrochemical methods had included an intensive study of the possibilities of the porous cup solution spark technique. Electronic equipment, including a flame photometer and a display microphotometer, was in course of development. Absorption spectrophotometry of organic constituents had included the continuance of the study of the lignin of sphagnum.

In the chemical study of soil organic matter the presence of rhamnose on soil had been fully established, the technique for quantitative determination of amino-acids improved, and the study of 'humus' directed towards new lines.

In the microbiological section, bacterio-

logical work had also continued along the lines indicated in last year's report while mycological studies had opened a new field of study of 'humus' formation and produced several interesting lines for further studies and new observations.

Radioactive Section Work

Work of the radioactive section had been along three main lines. In the study of the phosphate relationships of soils, the use of P as a tracer had been continued. The autoradiograph technique had been used to determine the distribution of mineral nutrients in the plant. A new application of radioactive material, other than as a tracer, had been made in an investigation of a method of determining soil moisture.

In the soil fertility section, improvement in both the yield and the feeding quality of crops continued to be the ultimate aim of the three main types of investigation in progress, namely: field experiments, pot experiments and laboratory studies. Field experiments under varying conditions were indispensable to the characterisation of the numerous factors determining soil fertility, and also to the assessment of the results of pot experiments and laboratory studies.

Accounts of results to date had been given in various publications and in contributions to a symposium on soil and fertiliser phosphorus in crop production held in the U.S.A.; the Sixth International Grassland Congress also held in the U.S.A.; and the meeting of the International Society of Soil Science held in Dublin.

One of the main aims of the field experiments was the characterisation of the yielding capacity and nutrient status of contrasting soil types. To this end, experiments conforming in design to modern statistical requirements were in progress on such subjects as responses of individual soils to various manurial and liming treatments; phosphate relationships of soils; methods of fertiliser application.

To supplement the basic data obtained in the field, pot experiments had been undertaken with special reference to the study of (a) the availability of superphosphate after varying periods of contact with different types of moist soil, (b) the use of radioactive phosporus to estimate the availability of phosphate residues in samples from field plots (c) the possible effects of 'Krilium' soil conditioner on the availability of native and applied phosphate.

Intensive analytical work had been undertaken on soil and produce samples from the field and pot experiments and special attention had been given to (1) the characterisation of the soils, (2) the effects of different treaments on the mineral composition of crops, and (3) the study of soil phosphate problems especially that of evaluating the phosphorus status of soils by laboratory methods. Papers describing results obtained in the study of manganese problems and in physico-chemical studies had been published.

'Lab' Makes the Product Safe

FEATURED in the winter issue of *Wall's Magazine*, house organ of T. Wall & Sons, Ltd., ice-cream and meat-products' manufacturers, of London, Manchester and Edinburgh, is an article on the firm's laboratories attached to the London, Manchester and Edinburgh factories.

Research work at Wall's, it is stated, has grown from a one-man laboratory, tucked away in a corner of the former bakehouse at Acton, until there are now two laboratories at Acton carrying out work for both the London factories (ice cream and meat products). The Godley (Manchester) and Craigmillar (Edinburgh) factories also have up-to-date laboratories.

Tests are carried out at Acton, Godley and Craigmillar not only on the finished products but also on the constituent raw materials. Samples of spices and flour, fat, sugar and vanilla beans are sent for testing in the analytical laboratory before orders are placed, and weekly tests are made on the brine to be used for curing bacon at Wall's bacon factory.

In addition, regular checks are made on products to ensure that they comply with the various legal standards. Sausages, for example, must not contain more than a definite percentage of preservative; ice cream must have certain minimum fat content. The laboratories have a third important job—experimental research.

DR. J. E. TAYLOR has been appointed a director of Joseph Crosfield and Sons, Ltd., and William Gossage and Sons, Ltd. Since 1946 he has been engaged with the technical division of Unilever, Ltd.

The Chemist's Bookshelf

ANNUAL REVIEW OF PHYSICAL CHEMISTRY—Vol. 3. Edited by G. K. Rollefson. Annual Reviews Inc., Stanford, California. 1952. Pp. lx + 416. $6.00.

In the post-war years the annual output of chemical literature has steadily increased; it is now larger than ever before. The task of presenting an authoritative comprehensive annual survey of chemistry in a volume of reasonable cost and dimensions has consequently become wellnigh impossible.

Two different approaches to this problem have been made. The British Chemical Society has modified the nature of the 'Annual Reports.' These no longer provide critical essays on particular subjects; instead a wide range of topics is treated briefly in what is essentially a classified guide to the current literature. Critical review articles now appear at quarterly intervals in 'Quarterly Reviews.' The alternative approach is exemplified by the volume under review. The subject of chemistry is divided up into its various branches, and these are reviewed annually under cover of separate volumes.

As the title announces, the present volume is concerned with physical chemistry and it is the third of the series. Although a wide range of topics has been covered in each volume published up to the present, the emphasis has shifted slightly from year to year in accordance with an experienced editorial board's judgment of the relative importance of immediately current interests. The individual authors thus have at their disposal more space than those who contribute to the section on physical chemistry in 'Annual Reports.' They can adopt more personal and discoursive approaches, and such are valuable when they emanate from specialists. The 'Annual Review of Physical Chemistry' may therefore be considered to furnish physical chemists with an important supplement to 'Annual Reports.'

The contents of the present volume include the following topics: Quantum Theory, Theory of Molecular Structure and Valence (C. A. Coulson); Radioactivity and Nuclear Theory (M. G. Mayer); Isotopes (J. Bigeleisen); Radiation Chemistry (A. O. Allen); Polymeric Electrolytes (P. Doty and G. Erlich); Ion Exchange (W. C. Bauman, R. E. Anderson, and R. M. Wheaton); Thermochemisty and Thermodynamic Properties of Substances (R. F. Newton); Bond Energies and Bond Distances (G. Glockler); Heterogeneous Equilibria and Phase Diagrams (C. J. Christensen and E. Roedder); Photochemistry (G. K. Rollefson); Photosynthesis (M. Calvin, J. A. Bassham, A. A. Benson and P. Massini); Spectroscopy (N. S. Bayliss); Polarography and Electrode Processes (C. Tanford and S. Wawzonek); Solutions of Non-Electrolytes (G. Scatchard); Solutions of Electrolytes (T. F. Young and A. C. Jones); Reaction Kinetics (R. E. Powell); Theory of Ionic Crystals, Semiconductors, and Dielectrics (F. E. Wiliams); Experimental Crystallography (W. H. Zachariasen); Experimental Molecular Structure (L. O. Brockway).

It will be clear from the previous paragraph that most important physicochemical topics have received authoritative attention. In every instance extensive reference lists of original literature are supplied and, often, papers which are not readily available are usefully summarised in the text. There are very complete author and subject indexes.—H. MACKLE.

AGRICULTURAL CHEMISTRY. Vol. II. Practical Applications. Edited by D. E. H. Frear. MacMillan & Co., Ltd., London. 71s. D. Van Nostrand Company Inc., New York 1952. Pp. viii + 588. $9.50.

This, the second volume of 'Agricultural Chemistry' follows about a year after the first volume made its appearance and it must be reviewed as part of the whole work which has been produced by an extensive group of American authors under the editorship of Professor Frear.

Volume I is concerned with principles and gives detailed emphasis to the biochemistry of living processes and products in higher plants and animals. Volume II is intended to cover practical applications and is divided into five sections as follows:—

i. The chemistry of major agricultural products which includes separate chapters on seeds and cereal crops, fruit and vegetables, and forage crops with three further chapters on meat and its products, milk and its products, and eggs and poultry products.

ii. Fertilisers and soil amendments which deals with nitrogenous, potassium, phosphate and mixed fertilisers, liming materials and also minor element supplements.

iii. Nutrition of farm animals with seven chapters devoted to dairy cattle, beef cattle, horses and mules, sheep and goats, poultry, swine, and domestic and fur-bearing animals.

iv. Pesticides which covers insecticides, fungicides and herbicides.

v. Commercial agricultural chemistry which covers two diverse chapters, one on inventions and patents the other on 'chemurgic' applications of agricultural products.

It is good to have the varied presentations of so many specialists contributing their separate chapters but herein lies the chief weakness of the book for it is difficult to blend such diverse topics into one unified whole. In consequence there is some unnecessary repetition mainly within sections. For example, in the first section each of the three chapters on crops deals in some measure with methods of proximate analysis yet none makes adequate reference to the official AOAC methods. Again, in section III the physiology of the ruminant stomach and the trace element requirements of cattle are discussed in the chapters on the nutrition of both dairy and beef cattle, although these topics have been treated previously in Vol. I. However, since the policy of the editor is for each chapter to present the reader with a good general understanding of the subject under discussion, repetitions of this nature are to be expected.

The editor has recognised in his preface that the field covered is too wide for an exhaustive treatment of the many branches of agricultural chemistry even in two volumes and so the space allotted to each author enables him to present little more than a summary. As a result the information is more in the nature of a highly condensed review suitable for specialists than a reasoned text for students' use. It would be too exacting to expect every aspect of agricultural chemistry to receive the same emphasis in a work of this nature, but the omission of any definite discussion of such important topics as the biochemistry of nitrogen transformations within the soil and the process of milk secretion calls for some comment.

In a few places compression of the text leads to misunderstanding or even to misstatements. Thus calcium nitrate fertiliser is stated to be manufactured from nitric acid produced in synthetic ammonia plants whereas, in Europe at least, the main supply is derived from the Birkeland-Eyde process. Then, in Chapter 15 on the nutrition of horses and mules the daily food allowance tables quoted are stated to be 'based on the assumption that the protein, energy and dry matter requirements for maintenance, growth, work and milk production vary with the three-fourths power of body weight.' Presumably what is meant is that horses grow, work and produce milk in proportion to the three-fourths power of their body weight which is rather different, but even this is a dubious assumption. In the same chapter the term 'heat increment of lactation' is introduced. This misleading concept implies that the extra heat evolved by lactating animals is the outcome of milk secretion whereas in point of fact it is associated with the extra food consumption of lactating animals.

The last section of the book introduces the reader to American patent law in its relation to inventions and discoveries in the realm of agricultural chemistry. The examples chosen serve to illustrate the points extremely well and one wishes that someone would oblige with an equally revealing account of the workings of British patent law.

Despite the points of criticism raised here the two volumes taken together present a wealth of information, but it seems doubtful if Volume II will stand the competition of more detailed and specialised reference books, which are now appearing in increasing numbers. The printing sets a very high standard, only two errors being noted in the text. There is something about the typograph which makes for easy reading without eye strain—a feature which might well be studied more closely by some other publishers of scientific treatises.—I.T. & T.G.T.

HOME

Restoring Fire Damage

Plans for the rebuilding of its oil refinery destroyed by fire on 9 December are already well in hand by J. O. Buchanan & Co. Ltd., Renfrew. A new lay-out has been designed and preparation of the site has already begun to allow building to be begun as soon as possible. Meanwhile another firm is carrying on production on behalf of the company.

Microchemistry Group's A.G.M.

The ninth annual general meeting of the Microchemistry Group of the Society of Public Analysts and Other Analytical Chemists will be held at the Sir John Cass College, Jewry Street, Aldgate, London, E.C.3, on Thursday, 29 January, at 7 p.m. Prior to the meeting there will be an afternoon visit to the new factory of Messrs. L. Oertling Ltd., St. Mary Cray, Orpington, Kent.

Railway Tolls Protest

Alginate Industries Ltd., of Barcaldine, prominent in the seaweed-chemistry industry field, is supporting a campaign to abolish tolls on the Connel Ferry Railway bridge. Chairman of the local committee, Lieut.-Colonel R. M. Campbell-Preston is managing director of the company whose factory is on the 'wrong' side of the bridge, and therefore subject to continuous tolls.

Royal Society Elections

The following have been elected officers and council of The Royal Society for the ensuing year:—President, Dr. E. D. Adrian, O.M.; treasurer and vice-president, Sir Thomas Merton; secretaries and vice-presidents, Sir Edward Salisbury, C.B.E., and Sir David Brunt; foreign secretary, Sir Cyril Hinshelwood. Other members of council: Professor P. A. Buxton, C.M.G.; Mr. H. Constant, C.B.E.; Professor P. I. Dee, C.B.E.; Professor E. C. Dodds, M.V.O.; Professor H. J. Emeléus; Sir Howard Florey (vice-president); Professor D. R. Hartree; Professor E. G. T. Liddell; Professor E. J. Maskell; Professor R. A. McCance; Professor H. H. Plaskett; Professor W. J. Pugh, O.B.E.; Professor Alexander Robertson; Dr. R. Stoneley; Professor G. Temple and Professor C. M. Yonge.

To Press Claim

The Transport and General Workers' *Journal* records that the trade union side of the Chemical and Allied Industries J.I.C., having had the benefit of executive advice and guidance, has asked for a meeting of the Council to again discuss the T.U.'s claim for a substantial wage increase. The employers, says the journal, having been advised that unless they are prepared to negotiate an equitable settlement, it is the Trade Union's intention to refer the claim to the Industrial Disputes Tribunal.

Reinforced Plastics

The Council of the British Plastics Federation, at its last meeting, approved terms of reference of a special technical committee to deal with reinforced plastics. It will be known as the Glass and Asbestos Fibre Reinforced Plastics Technical Committee. The first meeting will be held at the Federation offices, 47/48 Piccadilly, London, W.1, on Thursday, 15 January. Membership of the committee is restricted to members of the Federation.

New Seaweed Society

The Scottish Seaweed Research Association, now dissolved, has been re-formed by former members as The Seaweed Utilisation Society. The function of the new body will be to act as a two-way channel of information and opinion between end users of seaweed chemicals and derivatives and the Institute of Seaweed Research. Secretary of the new society is Miss M. D. Walker, 49 Rodney Street, Liverpool, 1.

British Plastics Exhibition

The opening of the second British Plastics Exhibition and Convention, at Olympia, London, originally fixed for Wednesday, 3 June, 1953, the day after the Coronation, has been postponed until Monday, 8 June, 1953. The exhibition will close on Thursday, 18 June. The organisers state that all space on the first floor of the exhibition has been taken and only a very few sites on the ground floor remain vacant.

• OVERSEAS •

New Silicone Polish

A new silicone car polish produced by Permoseal (Pty.), Ltd., Cape Town, is to be known as 'Permobrite.' It has not so far been possible to produce this on the desired scale because of the present import restriction, but the company hopes that presently it will be possible to bring in large quantities of raw materials.

Ammonium Sulphate Production

By treating ground gypsum with ammonium carbonate solution A. L. Burwell, of the Oklahoma Geological Survey, has made ammonium sulphate by dry reaction. Heating a powdered, intimate mixture of gypsum and ammonium carbonate between 80° and 90°C. for five hours under a slight back pressure and drying at 85°, Mr. Burwell has produced a powder consisting of ammonium sulphate and calcium carbonate representing a 94 per cent conversion. Although the idea is simple it has been considered so important that a major company in America is investigating it.

Aid for Lignite Scheme

Assistance in exploitation of the lignite resources of Madras State is likely to be given by the United Nations Economic Commission for Asia and the Far East, according to Dr. C. Y. Li, its officer in charge of mineral resources and projects, who recently visited the area. It has been learned that the Government of Madras has spent R.1,920,000 on the lignite project, while the estimated expenditure on the pilot scheme to ascertain the actual conditions which might be experienced in actual large-scale mining is Rs.7,900,000. The pilot scheme is expected to take two years to complete.

Cystine Heals Wounds

American biochemists have found that the sulphur-containing amino-acid cystine in the diet helps to heal wounds faster. Lack of it means that wounds rob surrounding tissue of the substance, slowing up the healing process. Methionine, from which the body makes cystine, has the same effect when added to the diet in the pure form or in proteins.

New Calcining Kiln

The only plant in Australia at present producing titanium pigments from Travancore ilmenite, is the Australian Titan Products Pty., Ltd., Burnie, Tasmania. A new addition to its plant is a calcining kiln which is 120 ft. long, 6 ft. wide at the top end, and 5 ft. 3 in. wide at the bottom. The unit, which is capable of handling 20 tons of material a day, is now nearing completion and expected to be in operation early next year.

Name for Insecticide

The interdepartmental Committee on Pest Control in America has selected the term 'captan' as a coined name for the fungicide N-trichloro-methylthiotetrahydrophthalimide. Captan was formerly designated as SR-406 and Orthocide. The California Spray-Chemical Corporation, which is registering 'captan' as a trademark in the U.S.A. and foreign countries, is taking steps to transfer the name from the list where it was registered for application as a trademark to a supplementary list. The name 'captan' will, therefore, be available for use as a common name for designating the chemical.

To Make Glass Fibres

A leading Australian glass manufacturing company in Melbourne, Victoria, will soon be making fibre glass for local industry. At present several Australian plants are experimenting on the application of fibre glass with polyester resins for production of glass resin laminates, which are popular in the United States of America, but which have not yet been made extensively in Australia.

Canadian Agency

Edwin M. Meade, Ph.D., A.R.I.C., has been appointed sole selling agent for industrial plant in Quebec and in eastern Ontario by Quickfit & Quartz Ltd. Dr. Meade, whose territory includes the important cities of Montreal, Toronto and Quebec, has also been granted non-exclusive selling rights for the firm's interchangeable laboratory apparatus. Until his emigration to the Dominion with his wife and family, Dr. Meade was engaged in the chemical industry in England.

PERSONAL

MR. DAVID JOHN ROBARTS has been appointed a director of Imperial Chemical Industries, Ltd. Mr. Robarts is a director of Robert Fleming & Co., joint deputy chairman of National Provincial Bank and deputy chairman of Union Discount.

MR. B. R. FRASER, B.Sc., has been appointed assistant refinery manager of the Vacuum Oil Company refinery, now nearing completion at Coryton, Essex. Mr. Fraser, who is an honours graduate of St. Andrews University, joined the Burmah Oil Company in 1927 as a plant chemist at the Digboi Refinery in Upper Assam, India. At various times he was in charge of each of the refinery departments, and in 1945 was appointed assistant refinery manager, and later occupied the position of refinery manager. Mr. Fraser, who comes from Forfar, in Angus, Scotland, has already taken up his appointment at Coryton.

MR. M. W. PERRIN, research advisor to Imperial Chemical Industries, Ltd., has accepted an invitation to become chairman of the Wellcome Foundation, Ltd., which trades under the name of Burroughs Wellcome & Co. Mr. Perrin succeeds Mr. H. E. Sier, who is retiring as chairman at the end of January. During the war Mr. Perrin was assistant director of Tube Alloys, the wartime atomic energy organisation, and from 1946 to 1951 was Deputy Controller (Technical Policy) in the Atomic Energy Division of the Ministry of Supply.

The Council of the Institute of Metals has awarded The Institute of Metals (Platinum) Medal for 1953 to PROFESSOR GEORG MASING, of the Institut für Allgemeine Metallkunde, Universitat Göttingen, in recognition of his outstanding contributions in the field of metallography.

The Council has awarded The Rosenhain Medal for 1953 to DR. CHARLES ERIC RANSLEY, of the Research Laboratories, the British Aluminium Co., Ltd., Gerrards Cross, in recognition of his outstanding experimental and theoretical work on gas-metal equilibria.

Choosing for his subject 'Spray Drying,' PROFESSOR WILLIAM ROBERT MARSHALL, of the department of chemical engineering at the University of Wisconsin, Madison, Wisconsin, delivered the fourth Annual Lecture of the American Institute of Chemical Engineers, on 8 December, at the Institute's annual meeting in Cleveland, Ohio.

Professor Marshall is a native of Calgary, Alberta, Canada, and received a B.S. in chemical engineering from the Armour Institute in 1938 and a Ph.D. from the University of Wisconsin in 1941. He was employed by E.I. Du Pont de Nemours & Co., Inc., at their experimental station at Wilmington, Del., from 1941 to 1947. During this period he was twice lecturer at the University of Delaware Extension in the presentation of two graduate courses in chemical engineering. In December, 1947, he returned to the University of Wisconsin as associate professor in chemical engineering, his principal duty was conducting graduate research, a position which he still retains.

The Colwyn Gold Medal for conspicuous scientific services to the rubber industry was presented by SIR CLIVE BAILLIEU, president of the Institution of the Rubber Industry, at its annual dinner in London on 11 December to DR. GEOFFREY GEE, director of the British Rubber Producers' Association, who has been made a Fellow of the Royal Society for his major contributions to rubber science. Sir Clive presented the Hancock Gold Medal, awarded for services to the industry not necessarily of a scientific nature, to DR. T. J. DRAKELEY, C.B.E., principal of the Northern Polytechnic since 1931, who in 1924 established the world's first rubber trade school and has been mainly responsible for setting up the National College of Rubber Technology of which he is the director.

MR. P. K. W. GREGGAINS, who has been managing director since April, 1942, has also been appointed chairman of Messrs. Reads, Ltd., the metal container manufacturers, Orrell House, Orrell Lane, Liverpool, 9, in succession to the late MR. E. B. READ.

MR. EARL BECK has been named executive vice-president of operations of Eli Lilly & Company, the Indianapolis pharmaceutical manufacturers. Formerly vice-president of industrial relations, Mr. Beck will have responsibility for manufacturing, operations planning, development and control, and marketing. MR. GEORGE L. VARNES has been made general manager of the operations group responsible to Mr. Beck.

In the administration section of the company, MR. FRED M. HADLEY, formerly treasurer, has become assistant executive vice-president. He is replaced as treasurer of the company by MR. J. O. WAYMIRE, who has served in the same capacity for the Lilly export affiliates. MR. R. E. WESTFALL becomes secretary and treasurer of the affiliated companies.

MR. JAMES D. HENDRY has been appointed to the Field Service Department of Potash, Ltd., in Scotland, as successor to the late Mr. Wm. S. Smith. For some time Mr. Hendry was on the staff of the Scottish Soil Survey and has also had practical farming experience. The office remains at 10 South Castle Street, Edinburgh.

Obituary

The death has occurred in a road accident at Colwyn Bay of MR. JAMES MARCHBANKS COOPER, M.B.E., 15 Glasgow Road, Kilmarnock, who was staff manager of the Nobel Division of Imperial Chemical Industries, Ltd. He joined the company in 1920 at the Roslin gunpowder mills, near Edinburgh, and in 1929 became a research chemist at the Ardeer factory.

During the last war he was assistant manager of the M.O.S. factory at Dalbeattie, and in 1942 he became manager of the Ministry of Aircraft Production factory at Bowhouse, Kilmarnock. He received the M.B.E. in 1946 in recognition of his services.

After the war Mr. Cooper became deputy division labour manager in the Nobel Division and, since 1951, he has been staff manager at headquarters in Glasgow.

The death occurred on 10 December of PROFESSOR JOHN SAMUEL STRAFFORD BRAME, C.B.E., at the age of 81. Educated at Sir Thomas Rich's School, Gloucester, and the Royal College of Science, South Kensington, he went to the Royal Naval College, Greenwich, as Demonstrator in 1897, and became Professor of Chemistry in 1914, a post which he held until 1931. From 1921-23 he was president of the Institution of Petroleum Technologists and chairman of the Standardisation Committee. Professor Brame's publications included:—contributions to the *Journals* of the Chemical Society, the Society of Chemical Industry, and the Institution of Petroleum Technologists; the Cantor and Howard Lectures for the Royal Society of Arts; Treatise on Fuel-Solid, Liquid and Gaseous; and Service Chemistry (5th edition).

Acton Technical College

A COURSE of lectures of interest to industrial chemists and research workers on 'Some Modern Physico-Chemical Methods and their Application in Chemistry' will be held at Acton Technical College, London, W.3.

The course, to be held in the department of chemistry and biology, on Friday evenings at 7.30 p.m., will consist of 11 lectures, divided into three series. In the first group, beginning on 16 January, 1953, E. S. Dreblow will give four talks on 'Emission Spectroscopy and its Application in Chemistry.'

In the second series, R. A. C. Isbell will deal with the subject of 'Absorption Spectrophotometry and its Application in Chemistry,' in four lectures on 13, 20, and 27 February and 6 March.

To complete the course, three talks on 'X-ray Analysis and its Application in Chemistry,' will be given on 13, 20, and 27 March, by E. R. Eglinton.

Accommodation is limited and early registration is advisable. Fee for the course of 11 lectures is £1 10s.

Alberta Oil Output

Crude oil ouput in Alberta increased by 38,714 barrels daily to average 133,229 barrels in the week ended 8 December, it was reported by the Petroleum and Natural Gas Conservation Board.

Publications & Announcements

ACCURATE measurement of pressure and vacuum is essential for gas works, steelworks and other heavy industrial establishments. To withstand the corrosive environments in which the instruments have to work, Monel is incorporated into the recorders produced by the Arkon Manufacturing Co., Ltd. Cheltenham. Working principles and construction of 'Arkon' recorders are described in *Wiggin Nickel Alloys* (No. 18). Other articles show the long service obtained by the use of Monel for pickling crates, and the advantages of its application in steam traps and arc welding transformers. Copies of the journal may be obtained on application to Henry Wiggin & Co., Ltd., Wiggin Street, Birmingham, 16.

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CONDUCTIVE RUBBER, its uses and general properties are described by P. D. Patterson, technical writer, Dunlop Research Centre, in an illustrated article in the Winter, 1952 number of *Rubber Developments* (Vol. 5, No. 4), issued by the British Rubber Development Board. In another article G. H. Harris, L.I.R.I., gives a report on the successful tests of two artificial cricket pitches of latex/cement compositions laid down at the ground of the Chelmsford Cricket Club.

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HEAT-ABSORBING and heat-resisting glass are the subject of two new technical data sheets now available from Chance Brothers, Ltd., Smethwick, Birmingham. The first deals with Chance ON.20 which for all practical purposes has the same colour and optical properties as Chance ON.19. The later type (ON.20) will, however, withstand about 30 per cent greater thermal shock as its coefficient of expansion is only 47×10^{-7}. A valuable improvement has also been achieved in that it is possible to mould Chance ON.20 into small flat or curved discs. The second sheet describes the various grades, functions, mechanical, and optical properties of Calorex. Among its industrial uses toughened Calorex plate forms a useful screen in front of small furnaces of muffles such as glass remoulding furnaces. It cuts off the infra-red radiation and so enables the operative to look into the furnace without intense discomfort which would otherwise be caused by the heat.

LATEST data on the aliphatic nitrogen compounds produced by the Carbide and Carbon Chemicals Company, a Division of the Union Carbide and Carbon Corporation is contained in a new book now available from the company. The work discusses in detail 35 aliphatic nitrogen compounds, their uses in many industries, physical properties, specifications, constant boiling mixtures, and shipping data. A bibliography is included which gives the important references in chemical literature to the amines and nitriles. A feature of the book is a section devoted to the specification test methods used by carbon for its aliphatic nitrogen compounds. These laboratory control tests comprise some of the standard A.S.T.M. methods as well as new methods that have been specially developed by the company's own laboratories. Copies of 'Aliphatic Nitrogen Compounds' (F.-4770), may be obtained from the Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York 17, New York.

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IN an increasing number of physical, chemical, and biological laboratories, means are required for the precise measurement and control of temperatures, especially of water and oil baths. To meet such needs the Equipment Division of Mullard Ltd., have recently made commercially available a temperature controller, type E.7594. This instrument enables the temperature of water baths and similar apparatus to be controlled to within fine limits, the response time being very rapid, while it has the additional advantages of being simple in operation, compact, and robust in construction. These features should make the instrument of particular value for use in connection with chemical analysis, and polarographic, conductivity, viscosity, and refractive index measurements. It should thus find many applications in the chemical, metallurgical, photographic, food, and textile industries. It also has possible uses in medicine and bacteriology. The sensitive element in the type E.7594 controller consists of a temperature-sensitive resistor, designed for direct immersion into the fluid to be controlled. The controller operates from 50-c/s, 110-120 or 200-250 volt supplies. Power consumption is 25 watts.

RECENTLY published by Chemonomics, Inc., of 400 Madison Avenue, New York, 17, N.Y., is a short guide to sales quota setting, by J. E. Ullmann, M.S., industrial engineer. It contains advice on how to select a system, information on activity points systems and on points systems for profit control, and devotes a chapter to sales contests—the pros and cons—and sales forecasts and quotas. These sales quotas are also reviewed in the capital goods industries and the chemical process industry. The booklet is obtainable from the company or through booksellers, price $3.

* * *

THE Quasi-Arc Company Limited have entirely redesigned their well-known Manganoid electrode which has been in use for many years for the welding of 12/14 per cent austenitic manganese steel. Manganoid (New Type) electrodes are fully extruded and are particularly easy to use with both direct and alternating current supplies. Recommended for the reinforcement of manganese steel, excavator buckets, digger teeth, rock crusher jaws, manganese steel railway points and crossings, they deposit crack resisting weld metal which work hardens rapidly to provide maximum resistance to wear, impact and abrasion.

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RECORDING balances of robust industrial design have recently been developed in France, and Griffin & Tatlock, Ltd., London, announces that it has been appointed exclusive agent for the British Commonwealth by the makers, Testut, of Paris. The balances draw a weight-time curve on a drum 150 mm. high by 240 mm. circumference. Sensitivity may be made as high as 1 mg. per mm. The time axis is determined according to the particular application. Typical applications include: plotting the evaporation rates of mixed solvents at different temperatures; thermo analysis of various products and recording of gas density or specific gravity. The instruments work on a new principle, by which the beam is continuously oscillating but is maintained in a state of dynamic equilibrium through a special platinum-gold contact fixed to it, energising a relay which controls a servo-motor. Equilibrium of the balance is restored, on the chainomatic principle by operation of the motor. The balances may be adapted for use with high temperature furnaces in controlled atmospheres, for recording weight changes of specimens, and for studying chemical reactions. Importation into the U.K. is subject to the granting of a Board of Trade licence. Prices of the instruments range upwards from about £350.

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TECHNICAL data on plastics is given in a new revised (4th) edition of the book of that title published recently by the Manufacturing Chemists' Association. This industrial handbook describes and catalogues properties of all commercially available plastics, its preparation and editing being supervised by Mr. M. G. Milliken, of the Hercules Powder Company. It covers 24 types of plastic materials—three more than the last edition, and contains two new sections which show the properties of various plastics when made in the form of foams or thin films. Materials for which data are published for the first time are alkyd and silicone moulding compounds and epoxy resins. Other types of plastics covered include urea-formaldehyde, melamine-formaldehyde, and phenolic moulding materials, cast phenolic resins and laminated thermosetting products, laminated melamine products, etc. Descriptive information and graphical and tabular data on fabrication, durability and electrical, mechanical and miscellaneous properties, are given in each case, all data given being derived from tests made by manufacturers from their own materials, by test methods established in most cases by the American Society for Testing Materials.

* * *

ELECTRONIC control equipment is the subject of two new data sheets just issued by Elcontrol, Ltd., London. No. 4 (issue 3) deals rather more extensively with electronic process and cyclic Timers than did the previous issue of this data sheet: in addition a new cyclic interval switch (type CS3) is described. No. 8 describes and illustrates a standard production type of photo-electric pyrometer controller of the on-off type, which should particularly interest engineers concerned with resistance butt welding and heat treatment of metals. It responds to the light emitted by the heated body, and is intended for the range 800°-1,750°C.

British Chemical Prices

LONDON.—Business in the industrial chemicals market has been reasonably good for the period although movements to the consuming industries have been very much curtailed owing to the approach of the holiday.

A fair interest has been shown in contract requirements and business covering deliveries during the first half of 1953, and the volume of inquiry for export has been reasonably good despite keen competition.

Price movements have been few and unimportant apart from the fluctuations in the chemical compounds of the non-ferrous metals. The current quotation for dry red lead and litharge is £129, and for dry white lead £144 15s.

Trading conditions in the coal tar products market continue rather uncertain but reports indicate a revival of interest in products which have been slow for many months. The creosote oils remain fairly active and there is a good outlet for carbolic acid and pyridene.

MANCHESTER.—Quiet trading conditions have been reported on the Manchester chemical market during the past week. As is usual at this time of the year, both fresh business and contract deliveries have been affected and not much real improvement in the position can be looked for until after the turn of the year. There has been little change in the general price position since last report.

GLASGOW.—The steady every-day demand for heavy chemicals has been maintained throughout the week. It is pleasing to see that textiles are continuing to come away and prospects for 1953 look very much better than they were this time last year. Export remains generally quiet with little change.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 1 ton, £96 ; 80% pure, 10 tons, £102 ; commercial glacial 10 tons, £98 ; delivered buyers' premises in returnable barrels ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £149 per ton.

Acetone.—Small lots : 5 gal. drums, £145 per ton ; 10 gal. drums, £135 per ton. In 40/50 gal. drums less than 1 ton, £115 per ton ; 1 to 9 tons, £114 per ton ; 10 to 49 tons, to £113 per ton ; 50 tons and over, £112 per ton.

Alcohol, Industrial Absolute.—300,000 gal. lots. d/d, 3s. 7½d. per proof gallon ; 100,000 and less than 200,000 gal. lots, d/d, 3s. 8½d. per proof gal.

Alcohol, Diacetone.—Small lots : 5 gal. drums, £162 per ton ; 10 gal. drums, £172 per ton. In 40/45 gal. drums ; less than 1 ton, £142 per ton ; 1 to 9 tons, £141 per ton ; 10 to 50 tons, £140 per ton ; 50 to 100 tons, £139 per ton ; 100 tons and over, £138 per ton.

Allyl Alcohol.—Less than 40 gals., 3s. 10½d. per lb. ; 40 gal., 3s. 6½d. per lb. ; 2 to 5 40 gal. drums, 3s. 4½d. per lb. ; 1 ton and over, 3s. 2½d. per lb.

Alum.—Ground, £24 per ton, f.o.r. MANCHESTER : Ground, £25.

Aluminium Sulphate.—Ex works, £12 per ton d/d. MANCHESTER : £14 to £15.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb

Ammonium Bicarbonate.—2 cwt. non-returnable drums ; 1 ton lots £47 per ton.

Ammonium Chloride. — Grey galvanising, £31 5s. per ton, in casks, ex wharf. Fine white 98%, £23 12s. 6d. to £26 5s. per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

Ammonium Persulphate. — MANCHESTER : £6 2s. 6d. per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £93 and £91 10s. per ton.

Antimony Sulphide.—Golden, d/d in 5 cwt. lots as to grade, etc., 2s. 3½d. to 3s. 1½d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

Arsenic.—Per ton, £59 5s. nominal, ex store.

Barium Carbonate.—Precip., d/d ; 2-ton lots, £35 5s. per ton, bag packing.

Barium Chloride.—£44 10s. 2 ton lots d/d bags.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £41 per ton d/d ; 2-ton lots, £41 5s. per ton d/d.

Bleaching Powder.—£21 per ton in casks (1 ton lots).

Borax.—Per ton for ton lots, in free 140-lb. bags, carriage paid: Anhydrous, £59 10s. ; in 1-cwt. bags; commercial, granular, £39 10s. ; crystal, £42 ; powder, £43 ; extra fine powder, £44 ; B.P., granular, £48 10s. ; crystal, £51 ; powder, £52 ; extra fine powder £53.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid : Commercial, granular, £68 ; crystal, £76 ; powder, £73 10s. ; extra fine powder, £75 10s. ; B.P., granular, £81 ; crystal, £88 ; powder, £85 10s. ; extra fine powder, £87 10s.

Butyl Acetate BSS.—£191 per ton, in 20-ton lots.

Butyl Alcohol BSS.—£180 per ton, in 10-ton lots.

***sec.*- Butyl Alcohol.**—5 gal. drums £174 ; 40/45 gal drums : less than 1 ton £144 per ton ; 1 to 10 tons £143 per ton ; 100 tons and over £140 per ton.

***tert.*- Butyl Alcohol.**—5 gal. drums £195 10s. per ton ; 40/45 gal. drums : less than 1 ton £175 10s. per ton ; 1 to 5 tons £174 10s. per ton ; 5 to 10 tons, £173 10s. ; 10 tons and over £172 10s.

Calcium Chloride.—70/72% solid £9 12s. 6d. per ton, in 4-ton lots.

Chlorine, Liquid.—£28 10s. per ton d/d in 16/17-cwt. drums (3-drum lots).

Chromic Acid.—2s. 0½d. to 2s. 0⅔d. per lb., less 2½%, d/d U.K.

Citric Acid.—1 cwt. lots, 213s. cwt. 5 cwt. lots, 208s. cwt.

Cobalt Oxide.— Black, delivered, 13s. per lb.

Copper Carbonate.—MANCHESTER : 2s. 7d. per lb.

Copper Sulphate.—£97 10s. per ton f.o.b., less 2%, in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £11 2s. d/d.

Ethyl Acetate,—20 tons and upwards, d/d, £151 per ton.

Formaldehyde.—£35 10s. per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £82 5s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G. £14 19s. per cwt.
Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, 12s. to 16s. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—27.5% wt. £124 10s. per ton. 35% wt. £153 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 21s. 3d. per lb. in cwt. lots.

Iodoform.—25s. 4d. per lb. in cwt. lots.

Lactic Acid.—Pale tech., 44 per cent by weight £122 per ton ; dark tech., 44 per cent by weight £67 per ton ex works one ton lots ; dark chemical quality 44 per cent by weight £102 per ton, ex works ; Usual container terms.

Lead Acetate.—White : £137 10s. per ton.

Lead Nitrate.—£105 per ton.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £129 ; orange lead, £141. Ground in oil : red, £156 ; orange, £168.

Lead, White.—Basis prices : Dry English, in 5-cwt. casks, £144 15s. per ton. Ground in oil : English, under 2 tons, £166 5s.

Lime Acetate.—Brown, ton lots, d/d, £30 to £34 per ton ; grey, 80-82%, ton lots, d/d, £34 to £39 per ton.

Litharge.—127s. 6d. per cwt. in 5-ton lots.

Magnesite.—Calcined, in bags, ex works, £22 to £24.

Magnesium Carbonate.—Light, commercial, d/d, £87 15s. ; cwt. lots £97 10s. per ton d/d.

Magnesium Chloride.—Solid (ex wharf), £15 per ton.

Magnesium Oxide.—Light, commercial, d/d, £240 ; cwt. lots £250 per ton d/d.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—19s. 3d. per lb. in 28 lb. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 6s. 4½d. per gal. ; pyridinised 64° O.P. 100 gal., 6s. 6d. per gal.

Methyl Ethyl Ketone.—5 gal. drums, £183 per ton ; in 40-45 gal. drums, less than 1 ton, £153 per ton ; 50 to 100 tons, £150 per ton ; 100 tons and over, £149 per ton.

Methyl *iso*Butyl Ketone.—5 gal. drums, £203 per ton in 40-45 gal. drums, less than 1 ton, £173 per ton ; 1 to 10 tons, £172 per ton ; 10 to 50 tons, £171 per ton ; 50 to 100 tons, £170 per ton ; 100 tons and over, £169 per ton.

Nickel Sulphate.—D/d. buyers U.K. £140 10s. per ton.

Nitric Acid.—£35 to £40 per ton, ex works.

Oxalic Acid.—Home manufacture, £170 per ton ; foreign manufacture, £137 10s. per ton.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £87 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

Potash, Caustic.—Solid, £98 10s. per ton for 1-ton lots ; Liquid, £37 15s.

Potassium Bichromate.—Crystals and granular, 11½d. per lb. ; ground, 1s. 0½d. per lb., standard quantities.

Potassium Carbonate.—Calcined, 98/100%, £116 per ton for 1-ton lots, ex store.

Potassium Chloride.—Industrial, 96%, 6-ton lots, £20 to £22 per ton.

Potassium Iodide.—B.P., 18s. 7d. per lb. in 28 lb. lots ; 18s. 1d. in cwt. lots.

Potassium Nitrate.—Small granular crystals, 81s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 9½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 8½d. per lb. ; technical, £9 2s. per cwt. ; for 5 cwt. lots.

***iso*Propyl Alcohol.**—Small lots : 5 gal. drums, £156 per ton ; 10 gal. drums, £146 per ton ; in 40-45 gal. drums : less than 1 ton, £126 per ton ; 1 to 9 tons, £125 per ton ; 10 to 50 tons, £124 per ton ; 50 to 100 tons, £123 per ton ; 100 tons and over, £122 per ton.

Salammoniac.—Dog-tooth crystals, £72 10s. per ton ; medium, £67 10s. per ton ; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

Salicylic Acid. — MANCHESTER : Technical 2s. 7d. per lb. d/d.

Soda Ash.—58% ex depôt or d/d, London station, £8 17s. 3d. to £10 14s. 6d. per ton.

Soda, Caustic.—Solid 76/77% ; spot, £23 5s. per ton d/d. (4 ton lots).

Sodium Acetate.—£85 to £91 per ton d/d.

Sodium Bicarbonate.—Refined, spot, £12 7s. 6d. per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 9¾d. per lb. ; anhydrous, 11¼d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite.—Powder, 60/62%, £40 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£87 to £95 per ton.

Sodium Cyanide.—100% basis, 8d. to 9d. per lb.

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals £28 a ton ; commercial, 1-ton lots, £26 per ton carriage paid.

Sodium Iodide.—B.P., 20s. 1d. per lb. in 28 lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £123 ton.

Sodium Metasilicate.—£22 15s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, 97-98%, 6-ton lots, d/d station, £29 5s. per ton.

Sodium Nitrite.—£31 for 1 ton lots.

Sodium Percarbonate.—12½% available oxygen, £8 8s. 4½d. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £78 10s. ; tri-sodium, crystalline, £39 10s., anhydrous, £75 10s.

Sodium Prussiate.—10d. to 10½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber's Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER : £7 per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot. £30 per ton, d/d, in drums ; broken, £30 15s. per ton, d/d, in drums.

Sodium Sulphite.—Anhydrous, £59 per ton, pea crystals, £37 12s. 6d. per ton d/d station in kegs ; commercial, £23 7s. 6d. per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £22 16s. 6d. to £25 6s. according to fineness.

Tartaric Acid.—Per cwt. : 10 cwt. or more, £11 10s.

Titanium Oxide.—Standard grade comm., with rutile structure £143 per ton ; standard grade comm., £130 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d ; white seal, £138 10s. ; green seal, £137 10s. ; red seal, £136.

Rubber Chemicals

Antimony Sulphide.—Golden, 2s. 3½d. to 3s. 1½d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

Carbon Bisulphide.—£65 5s. per ton, according to quality.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£74 10s. per ton.

India-rubber Substitutes.—White, 1s. 6½d. to 1s. 10½d. per lb. ; dark, 1s. 4½d. to 1s. 8½d. per lb.

Lithopone.—30%, £60 per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, 'Rupron.'—£20 per ton.

Sulphur Chloride.—British 48s. 6d. per cwt.; Imported £120 per ton.

Vegetable Lamp Black.—£64 8s. per ton in 2-ton lots.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, £16 18s.

Compound Fertilisers.—Per ton in 6 ton lots, d/d farmer's nearest station, I.C.I. Special No. 1 £27 9s.

'Nitro-Chalk.'—£12 9s. 6d. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots d/d nearest station, £28 15s. per ton.

Coal-Tar Products

Benzole.—Per gal, ex works : 90's, 3s. 8½d. ; pure, 3s. 11½d. ; nitration grade, 4s. 2½d.

Carbolic Acid.—Crystals, 1s. 6d. to 1s. 8d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 6d. to 1s. 8d. per lb., d/d crude, 8s. naked, at works.

Creosote.—Home trade, 10d. to 1s. 2d. per gal., according to quality, f.o.r. maker's works. MANCHESTER : 1s. to 1s. 8d. per gal.

Cresylic Acid.—Pale 99%, 5s. 8d. per gal. ; 99.5/100%, 5s. 10d. American, duty free, for export, 5s. to 5s. 8d. naked at works.

Naphtha.—Solvent, 90/160°, 4s. 10½d. per gal. for 1000-gal. lots ; heavy, 90/190°, 4s. 3½d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots.

Naphthalene.—Crude, ton lots, in sellers' bags, £18 16s. 3d. to £34 per ton according to m.p. ; hot-pressed, £50 to £60 per ton, in bulk ex works ; purified crystals, £68 10s. to £79 3s. 4d. per ton.

Pitch.—Medium, soft, home trade, 130s. per ton f.o.r. suppliers' works ; export trade, 200s. per ton f.o.b. suppliers' port. MANCHESTER : £8 f.o.r.

Pyridine.—90/160°, 42s. 6d. per gal. MANCHESTER : 42s. 6d. to 45s. per gal.

Toluol.—Pure, 4s. 7½d. per gal. MANCHESTER : Pure, 4s. 7½d. per gal. naked.

Xylol.—For 1000-gal. lots, 5s. 6d. per gal., according to grade, d/d.

Intermediate and Dyes
(Prices Nominal)

m-**Cresol** 98/100%.—3s. 9d. per lb. d/d.

o-**Cresol** 30/31° C.—1s. 4d. per lb. d/d.

p-**Cresol** 34/35° C.—3s. 9d. per lb. d/d.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb. ; 66/68° C., 1s.

p-**Nitraniline.**—2s. 11d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—1s. 2d. per lb. ; P.G. 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10-cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

E.R.W. Steel Tube-Making

Process Demonstrated by Film

MAKING of steel tubes by welding the edges of strip bent into circular form is not new. Processes used in the past, however, while giving welds of adequate strength for the purpose for which the tubes are to be used, seldom produced a weld as strong as the parent metal. Such a weld is, however, produced by the latest type of electric resistance weld mill recently installed by Stewarts and Lloyds Limited at Corby in Northamptonshire for the production of high grade steel tubes.

A new film 'E.R.W.,' showing the electric resistance weld process was recently given a private display by Stewarts & Lloyds in another interesting picture to the excellent series of short films made by the company partly to interest and instruct its own personnel, partly for the information of customers overseas agents and representatives, and partly to help meet the growing demand for films of this nature from schools and other organisations.

Electric Resistance Weld

'E.R.W.' stands for 'Electric Resistance Weld,' a steel tube-making process in which cold rolled steel strip is cold formed into a cylinder and the abutting edges are welded by means of a comparatively high frequency alternating current without the addition of any weld metal. For high quality tubes, such as boiler tubes, it is, of course, essential that the weld be not only as strong as the parent metal, but consistently good throughout its whole length. This can only be attained by constant attention to the correct working conditions and by ensuring complete uniformity and consistency of the steel and of the process. Stewarts and Lloyds are particularly well placed in this respect in that at Corby they use their own up-rising scrap and iron made direct from their own ores in their own steel plant. These virgin raw materials ensure that the steel is free from elements which would be undesirable from the welding point of view.

After briefly touching on the steel and strip making processes the film covers the 'E.R.W.' process in detail and ends with a series of 'shots' showing some of the many uses to which Stewarts and Lloyds 'E.R.W.' tube has already been put, in the cotton industry, in tanker heating coils, in boilers for whisky distilleries and tea estates, in locomotive and ship's boilers, in roller conveyors, and refrigeration plant.

Production was by Ace Distributors, and the film which is available in both 16 mm. and 35 m.m. sizes runs for 31 minutes.

Another film show shown was 'The Great Jib,' which tells the story of the design and construction of the tubular steel jib of the W.1400 walking dragline.

This machine was built for Stewarts and Lloyds' quarries where the ironstone, the raw material of steel, now lies at depths of up to 100 feet below the surface. The removal of this enormous quantity of 'overburden' consisting of earth, clays, and limestone presented a problem with which no existing excavating machinery could cope. A new machine, the biggest of its kind in the world, and incorporating several totally new features had to be designed. Chief among them was the tubular steel jib which, at work, stands 265 feet in the air, higher than Nelson's Column in Trafalgar Square.

From the original conception, the film goes through the processes of manufacture of the steel, the rolling of the tubes and their fabrication on site, up to the point where the jib is attached to the housing. It ends with the mighty machine, finally completed, going to work in September, 1951, in the ironstone quarries shifting up to 1,600 tons of overburden an hour under the control of one man.

Among the series of S. & L. films which may be borrowed by schools, technical colleges, scientific bodies and trade associations is a short colour (16 mm. sound) 'Steel Pipes for Sindri.' This shows the erection and laying on the site of the 80 miles of pipework required for the process of making sulphate of ammonia at Sindri fertiliser plant in India.

New U.S. Oil Refinery

Plans for the first full-scale oil refinery in the American Pacific North-West are being made by the General Petroleum Corporation. The projected refinery, which will be situated on an 850-acre site near Ferndale, Washington, will refine Canadian crude oil brought from an extension to the 711-mile Edmonton to Vancouver pipeline.

Chemical & Allied Stocks & Shares

THERE has been considerable uncertainty in stock markets during 1952, and with caution the keynote, particularly in the industrial sections, buyers have given main attention to British Funds. The latter fell heavily in the early part of the year owing to the raising of the bank rate to 4 per cent and talk of a further increase, though the current view is that a lower, rather than a higher, bank rate seems likely in 1953. Industrial shares have been inclined to move closely with the trend in British Funds. Financial results in general have shown contraction from the levels reached in 1951, when inflationary influences were at their peak, but the majority of dividends have been maintained at the 1951 rates.

Prevailing Trend

Chemical and allied shares have reflected the prevailing trend and although sentiment in recent weeks has been affected by reports of falling off of business in some sections of the industry, most shares are closing the year well above lowest levels touched in 1952. Imperial Chemical are 43s. 10½d. at the time of writing, which compares with highest and lowest of 47s. 3d. and 38s. 7½d. during the year. The market view is that there are good prospects of the dividend being maintained at 13 per cent. It is also being assumed in the City that, if the company made a fresh application for permission to distribute a share bonus, it would be granted. It may be recalled that the chairman has stated that another application might be made; but it is realised that a share bonus would not itself mean an increase in the amount distributed in dividend in future on the larger capital. Fisons, which are now 30s. 6d., have strengthened since the results were issued recently; extreme levels in 1952 have been 32s. 3d. and 25s. 7½d. Since dealings started earlier this year, Reichhold Chemical 5s. shares have moved between 9s. 6d. and 7s. 10½d. and the current price is 8s. 9d. Boake Roberts 5s. shares have moved between 18s. and 12s. 6d. in 1952 and are now 13s. 9d., while Brotherton 10s. shares are 22s. 4½d., which compares with extremes during the year of 21s. 7½d. and 24s. 6d. W. J. Bush, now 46s. 3d., have been up to 61s. 3d. and down to 44s. in the past twelve months, while Greeff Chemicals Holdings 5s. shares (now 17s.) have had extremes of 18s. and 13s. Albright & Wilson 5s. shares have moved between 18s. 3d. and 14s. 1½d. and are now 15s. 9d. Hickson & Welsh 10s. shares at 9s. 9d. are now around the best level for the year; the year's lowest was 8s. 9d. Monsanto 5s. shares are now 23s. 6d. (1952 extremes have been 28s. 9d. and 21s. 6d.).

Among other shares, the following gives current prices and the 1952 highest and lowest levels. Borax Consolidated 37s. 1½d. (37s. 9d. and 31s. 9d.) British Glues & Chemicals 4s. shares 12s. 3d. (14s. and 9s. 7½d.). British Xylonite 26s. (31s. 9d. and 22s. 7½d.). Coalite & Chemical 2s. shares 2s. 1½d. (2s. 7d. and 1s. 10½d.). British Industrial Plastics 2s. shares 4s. 3d. (6s. 6d. and 3s. 6d.). United Molasses 29s. 6d. (37s. 6d. and 25s. 9d.). The 4s. units of the Distillers Co., which are now 16s. 6d. xd, have had extreme levels in 1952 of 20s. 6d., and 16s. 4½d. Unilever have moved between 38s. 9d. and 49s. 6d. in 1952 and are 45s. 9d. at the time of writing. Extremes for Boots Drug 5s. shares have been 22s. 9d. and 16s. 10½d. and the current price is 20s. Associated Cement are now 103s. 3d.; 1952 extremes were 105s. and 89s. 9d.

Anglo-Iranian Fluctuations

Turner & Newall have been up to £5 and down to 77s. 9d. in the year and are now 98s. Powell Duffryn (now 31s. 1½d.) have had extremes of 33s. 9d. and 24s. in the year. Among Oils, Anglo-Iranian are now £5⅛; extremes in 1952 have been £6⅛ and £5 3/32. Shares of the latter company have fluctuated with the trend of news from Persia. Market view is that they are probably worth well over their current price on their non-Persian assets alone, bearing in mind the company's big expansion in the Middle East and elsewhere. The Anglo-Iranian £20,000,000 issue of 5 per cent debentures at £98½ per £100 of stock, lists for which open and close on 6 January, is expected to be a big success in the City where a premium of up to £1 10s. over the issue price when dealings start is being predicted. During 1952 Shell have had extreme levels of 86s. and 64s.; the current price is 76s. 10½d. at the time of writing.

Particle Size Analysis

Nottingham Conference in 1954

THERE have been in recent years numerous publications relating both to the development of instruments and to the fundamental physics of the processes involved in measuring particle size, especially for sizes in the range of 0.1-30 microns. Measurement of particle size distributions are made in many sciences and industries and as it is now some five years since the last British conference on particle size analysis (organised by the Society of Chemical Industry and the Institution of Chemical Engineers) it is felt that the time is now opportune for a further exchange of views.

To this end, The Institute of Physics announces that it is arranging a conference on 'The Physics of Particle Size Analysis' to be held in the University of Nottingham from 6-9 April, 1954.

It is anticipated that the various sessions will cover not only such fundamental physical processes as the fluid dynamics and the optics of particles and systems of particles, but also accounts of other phenomena encountered in particle size analysis such as the aggregation and dispersion of particles in a fluid. Arrangements will be made also for a discussion on automatised methods of counting and sizing.

Although the conference will be primarily concerned with the physical principles of particle size analysis, the development of new instruments and their use will receive attention, particular interest being attached to the systematic comparison of different methods of particle size analysis.

The organising committee is prepared to consider offers of papers describing original work for reading and discussing at the conference. Synopsis of any proposed contribution should be sent before 3 February, 1953, to the conference honorary secretary, Mr. R. L. Brown, F.Inst.P., F.Inst.F., at The Institute of Physics, 47 Belgrave Square, London, S.W.1. Papers will be refereed in the usual way before acceptance and will be published, with summaries of the discussion on them as part of the *British Journal of Applied Physics*—one of the institute's journals. In order that advanced proofs may be available in good time prior to the conference, it is desired that the manuscripts should be received by the end of October, 1953.

Company News

Laporte Chemicals, Ltd.

At an extraordinary general meeting of Laporte Chemicals Ltd., held in London on Tuesday, 16 December, a resolution amending the Articles of Association of the company giving the directors power to increase its borrowing powers to £3,500,000 (cf. THE CHEMICAL AGE, **67**, 743), was passed unanimously.

Powell Duffryn Ltd.

An interim dividend of 3 per cent actual (less tax) on its £9,660,471 ordinary stock for the year ending 31 March, 1953, is announced by Powell Duffryn Ltd. Payment to be made on 24 February, 1953, to holders registered on the books of the company at the close of business on 1 January, 1953. Transfer books will be closed for one day on 2 January, 1953.

New Registrations

Cittex Manufacturing Co. (London) Ltd.

Private company. (514,182). Capital £200. Manufacturers and importers of chemicals, fluids used in connection with the manufacture of textiles. Directors: D. D. Sellon, H. J. Parker, J. I. Berry. Reg. office: 2 Guildhall Chambers, 31/4 Basinghall Street, E.C.2.

Increase of Capital

The following increase of capital is announced:—ALEXANDER HOPE JUNIOR & CO., LTD., (analytical chemists), increased from £20,000 to £50,000.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order, 1952.

EXPERIENCED EXPORT CLERK required by established City exporters of chemicals for their selling department. Age below 32. Commercial or chemical studies would be an advantage. Apply **BOX No. C.A. 3185, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

MICROBIOLOGIST. Company engaged in fermentation industry has a vacancy for a Microbiologist for routine maintenance of pure cultures, both in laboratory and development of early stages in plant. The successful applicant will also be required to carry out a certain amount of research work in connection with the growing of organisms and the recovery of products of metabolism. A flair for and an interest in this kind of work, together with previous experience, will be useful. Salary, etc., according to experience and qualifications. Appointment is in East Anglia. Full details to **BOX No. C.A. 3184, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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250kW STEAM-DRIVEN GENERATOR SET, 400 volts D.C., 3-wire, 625 amps., 375 r.p.m. Direct driven by 365 h.p. Bellis & Morcom compound steam engine No. 6203. Steam, 180 lb. sq. in., exhausting to 26 in. vacuum, and subject to valve setting could be modified for 160 lb. sq. in., and back pressure up to 10/20 lb. At present installed with surface condenser by Bellis & Morcom, with circulating pump and Edwards extraction pump.

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